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SNOTEL WATER SUPPLY FORECAST AND INSTRUMENTATION DEVELOPMENT

ARS-SCS COOPERATIVE STUDY

Northwest Watershed Research Center Pacific West Area Agricultural Research Service U.S. Department of Agriculture Boise, Idaho

O Annual Progress Report No. 7

Cooperative Agreement No. 12-14-5700-0010

for FY 1987

To

Soil Conservation Service U.S. Department of Agriculture

December 1, 1987

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SNOTEL Water Supply Forecast and Instrumentation Development Study

Personnel Involved:

K. R. Cooley,
Hydrologist

A. L. Huber, Mathematician

D. C. Robertson, Hydrologic Technician

M. D. Burgess, Electronic Technician Plan, conduct, and report on the simulated SNOTEL pressure transducer diurnal fluctuations.

Plan, conduct, and report on the existing SNOTEL pressure transducer diurnal fluctuations.

Assist in planning and conducting the pressure transducer evaluations.

Design, fabricate, test, and service any electronic instrumentation arising from this study.

SNOTEL Water Supply Forecast and Instrumentation Development Study

INTRODUCTION

Cooperative research between the SCS Water Supply Forecasting Group in Portland, Oregon and the Agricultural Research Service (ARS) Hydrologists in Boise, Idaho concentrated on three areas during fiscal year 1987. The major emphasis was to complete a study designed to determine the cause and magnitude of diurnal fluctuations in pressure transducer readings from SNOTEL precipitation gages during nonprecipitation periods. The research consisted of conducting a series of tests at the Boise Federal Building simulated SNOTEL site designed to provide an increased understanding of the system and fluid characteristics, and to evaluate possible techniques for alleviating problems at field sites. Tests were also continued at the field SNOTEL sites. First, data from all SNOTEL sites were obtained four times per day during a nine-day period in June 1987. These data were analyzed to identify those sites that exhibited diurnal fluctuations greater than allowed by design specifications. Twenty of the sites with large fluctuations were selected to receive new transducers that had been laboratory tested to establish pressure-temperature relationships. After installation of the new transducers, data from the SNOTEL sites were again obtained for analysis for a twelve-day period in October 1987.

A second study involved establishing a procedure for evaluating five different methods used by the various forecast centers for determining the reasonable maximum and reasonable minimum forecasts of streamflow. The objective was to evaluate the five different methods by comparing reasonable maximum and reasonable minimum statistics obtained by applying all five methods for seven different forecast points. The work completed for this year was limited to comparing the values obtained for one forecast point, the American Fork River near American Fork, Utah. This work will continue during the coming year.

A brief report describing field experience with several types of climatological sensors and data collections systems was also completed.

OBJECTIVES

The objectives of the research conducted during fiscal year 1987, as outlined in the cooperative SCS-ARS workplan and amendments, are summarized as follows:

I. SNOTEL Precipitation Data Fluctuation Study

A. Complete calculations of the magnitude of diurnal fluctuations considering temperature effects on the system, the fluid, and the transducer, for a variety of system configurations and fluids. Compare calculated fluctuations with those observed at the simulated SNOTEL site.

- B. Compare the performance of the same Robinson-Halpern pressure transducers at a field site and at the simulated SNOTEL site.
- C. Develop relationships between pressure and temperature for the SNOTEL sites and compare with previous relationships where possible. Use the correction equation developed to compare corrected and uncorrected values and demonstrate the magnitude of errors involved.

II. Reasonable Maximum-Reasonable Minimum Study

A. Examine and evaluate five different methods of calculating reasonable maximum and reasonable minimum water supply forecasts to establish their comparability.

III. Instrumentation Study

A. Summarize field experience relating to climatological sensors, applicable for use at SNOTEL remote sites, gained from research at the Reynolds Creek Watershed, Idaho study site.

Section I SNOTEL Precipitation Data Fluctuation Study

The reliability of precipitation gage readings from remote SNOTEL sites has been a concern to flood forecasters for several years. Diurnal fluctuations of over an inch have often been observed when precipitation did not occur. Indications of rainfall of this magnitude in a 12-hour period or less could affect flood forecasts drastically when snowpack conditions on a watershed are such that flooding could occur at any time. An initial analysis of precipitation gage readings from 517 remote sites showed that 60 percent exhibited a temperature dependency, and about 40 percent had diurnal fluctuations larger than specified in the pressure transducer design criteria. (See ARS-SCS Annual Progress Report No. 6, December 1986.) Because of these results, a more intensive study was initiated to 1) identify the problem, 2) develop correction equations, and 3) develop physical methods of correction.

Review of Fiscal Year 1986 Studies

Data from the SNOTEL sites were analyzed for two periods in July and August 1986. The first analysis revealed that data would need to be collected at least four times per 24-hour period in order to establish relationships between temperature and pressure transducer readings. Data from the second period provided sufficient information to develop correction equations for each site based on temperatures observed. The analysis also showed that about 40 percent of the sites were exhibiting diurnal fluctuations in pressure transducer readings greater than what should have been recorded according to transducer design specifications. (See ARS-SCS Annual Progress Report No. 6, December 1986.)

Research at the simulated SNOTEL site conducted during fiscal year 1987 was designed to complement previous work. Selected tests were conducted using specific fluids to provide data for conditions not previously tested. Also, methods designed to reduce the diurnal fluctuations (based on results from last year's test) were tested as outlined in the objectives.

Site Changes and Tests Conducted

Some minor changes were made on the simulated SNOTEL site prior to conducting tests during 1987. Changes to the system consisted of replacing the rubber hose and plastic pipe between the precipitation gage and the instrument shelter with a copper tube and adding a tygon tube manometer to the north side of the precipitation gage, thus simplifying the plumbing. These simplifications were justified based on last year's results, which indicated that the Robinson-Halpern* pressure transducer responded well to rainfall

^{*}Use of brand names is for reader convenience and does not constitute endorsement by the U.S. Department of Agriculture, Agricultural Research Service.

measured by the Bureau of Reclamation recording raingage at the site. Also, the pressure traces produced by the Robinson-Halpern transducer and two Druck transducers were essentially the same, thus the two extra transducers and the extra plastic pipe were not required. Other changes involved relocation and addition of temperature sensors.

The number of temperature sensors in the gage was reduced from 5 to 3, and they were placed so that the lowest would always be in the fluid, the highest would always be above the fluid, and the middle one would be in or above the fluid, depending upon the amount of fluid in the gage. Four new temperature sensors were attached to the exterior surface of the gage so that a north-facing and a southfacing pair of sensors would be above fluid level, and a pair of sensors would be measuring exterior gage surface temperature within the depth of the fluid. A new temperature sensor was placed in the precipitation gage chamber underneath the fluid and above the ground surface. Temperature sensors were also placed on the copper tubing 12 to 14 inches below the ground surface, between the gage and the shelter (Fig. 1).

Air temperature and precipitation were monitored on recording equipment existing at the site. All of the data were recorded at 15-minute intervals throughout the study period. In addition, manometer readings were made near the time of maximum and minimum air temperature on most days during the study period.

Fifteen test periods were selected for study analysis. The conditions imposed on the system, the fluid level, fluid characteristics, average change in manometer level, and average daily temperature change are shown in Table 1 for one day during each of these periods.

Results

A. Simulated SNOTEL Site Studies

Tests conducted at the Boise simulated SNOTEL site were designed to augment last year's results, and to provide additional information about the fluids and the system. Figures 2 through 16, which show variations in pressure and temperature for 15 different 3-day study periods, indicate that responses to valve settings and fluid characteristics are similar to those obtained last year. For example, closing the valve at the base of the gage (Fig. 1) changed the relationship between temperature and pressure from inverse to direct (Fig. 2 vs. Fig. 4). Also, the magnitude of the diurnal pressure fluctuation diminished as the concentration of methyl-alcohol and ethylene-glycol (commonly called Glyco-Meth) in the mixture decreased (as percent water increased) as shown in Figures 2, 5, and 6.

Further study of Figures 2-16 indicates that temperature effects on the electronic data recording equipment are negligible, since the magnitude and timing of the fluctuations can be changed simply by opening and closing the valves, while all other factors remain the same. Changes in fluid characteristics also change the magnitude of the fluctuations while all else remains the same. Further evidence that the electronic package was not affected significantly by temperature was obtained when a completely different type of data acquisition system was installed.

SIMULATED 'SNOTEL' SITE LOCATED AT THE BOISE FEDERAL BUILDING

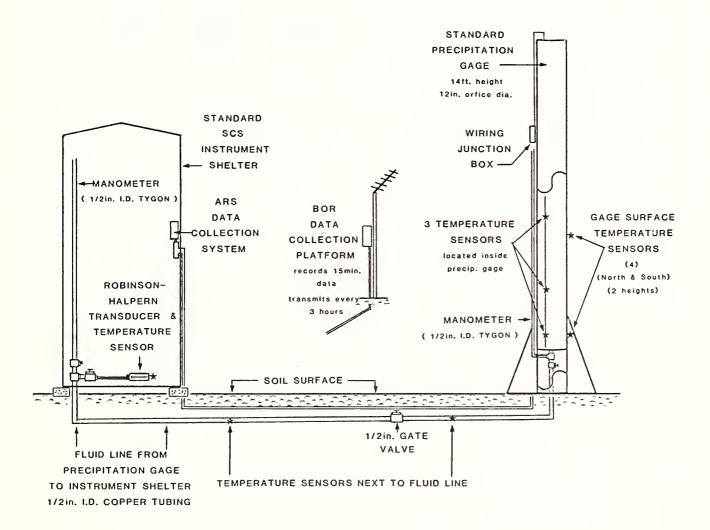


Figure 1. Schematic diagram of the Boise Federal Building simulated SNOTEL site showing location of system components and sensor.

Table 1. Conditions imposed on the simulated remote precipitation gage system, during 15 periods studied, fluid level and characteristics, observed fluid level changes, and average daily temperature changes.

	(1987) & an Day)	Fluid Type	Depth of Fluid in Precip. Gage (inches)	System Configuration	Average Daily Change in Manometer Reading (inches)	Average Daily Change in Air Temp. (°F)
6-13	(164)	95% glyco-meth	10.5	Open	0.19	41.6
6 - 25	(176)	95% glyco-meth 5% water	10.5	Line valve closed	0.56	44.0
6 - 27	(178)	95% glyco-meth 5% water	10.5	Gage valve closed	0.75	36.1
7 - 3	(184)	30% glyco-meth	30.5	Op en	0.72	34.9
7-7	(188)	18% glyco-meth 82% water	50.5	Open	0.94	30.8
7-13	(194)	18% glyco-meth 82% water	50.5	Line valve closed	0.75	41.7
7-15	(196)	18% glyco - meth 82% water	50.5	Open - galvanized shield	0.41	44.7
7 - 26	(207)	18% glyco-meth 82% water	50.5	Open - brown shield	1.44	45.0
8-4	(216)	100% ethylene- glycol	10.0	Open	0.19	49.9
8-8	(220)	100% ethylene-	10.0	Closed	0.31	42.5
8-11	(223)	40% methanol 60% water	13.0	Open	0.13	34.3
8-18	(230)	100% glyco-meth	10.0	Open .	-0.09	46.0
8-24	(236)	100% glyco-meth		Open - white paint	0.06	35.7
9 - 2	(245)	100% glyco-meth	10.0	Open - brown paint	0.03	27.1
9-13	(256)	100% glyco-meth	10.0	Open - brown paint		41.6

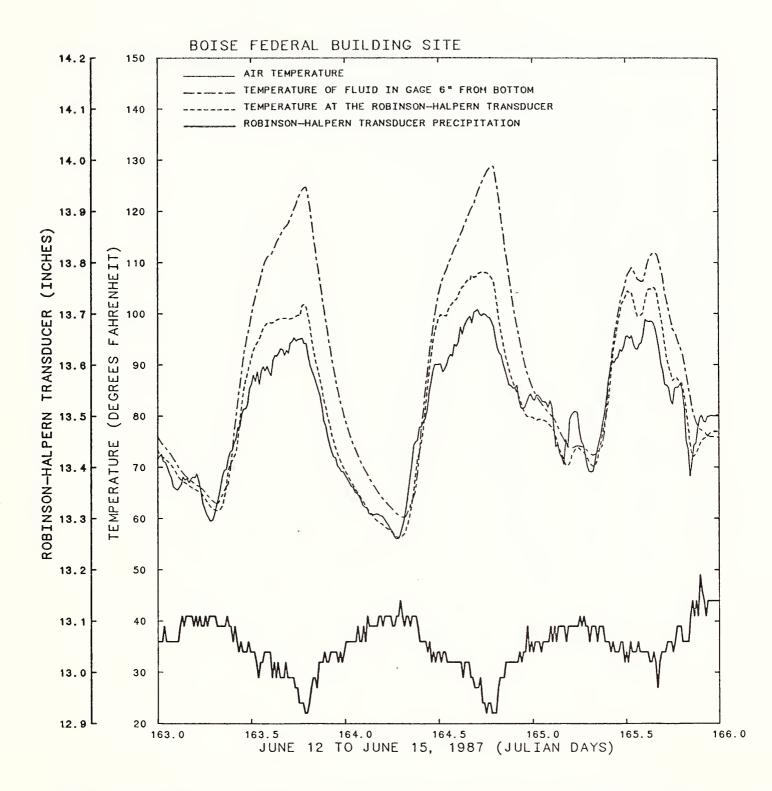


Figure 2. Temperature and pressure transducer records from the simulated SNOTEL site near the Boise Federal Building. All valves open - 95% Glyco-Meth - 10.5 inch fluid depth, June 12 to June 15, 1987.

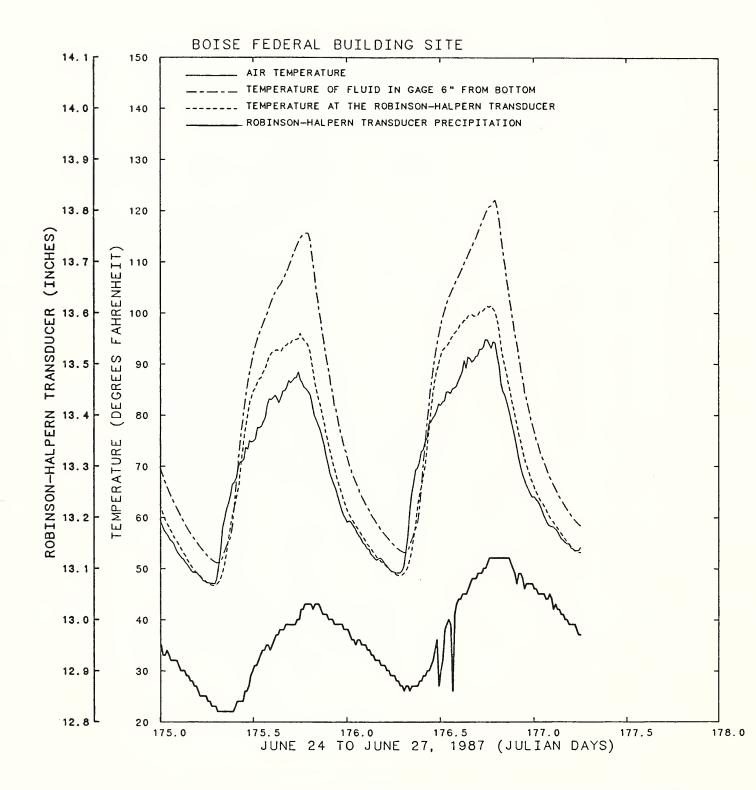


Figure 3. Temperature and pressure transducer records from the simulated SNOTEL site near the Boise Federal Building. Line valve closed - 95% Glyco-Meth - 10.5 inch fluid depth, June 24 to June 27, 1987.

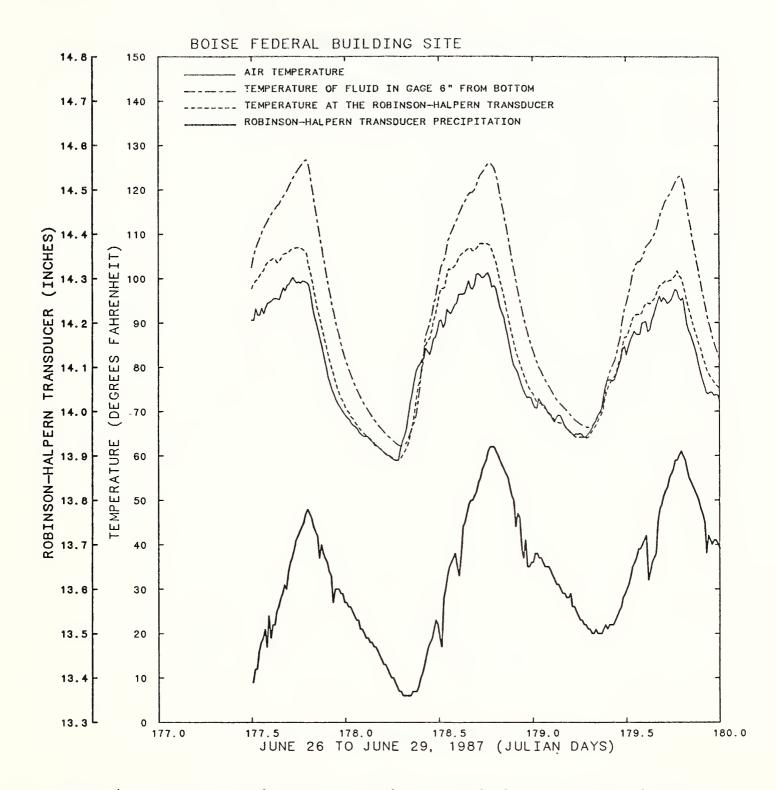


Figure 4. Temperature and pressure transducer records from the simulated SNOTEL site near the Boise Federal Building. Gage valve closed - 95% Glyco-Meth - 10.5 inch fluid depth, June 26 to June 29, 1987.

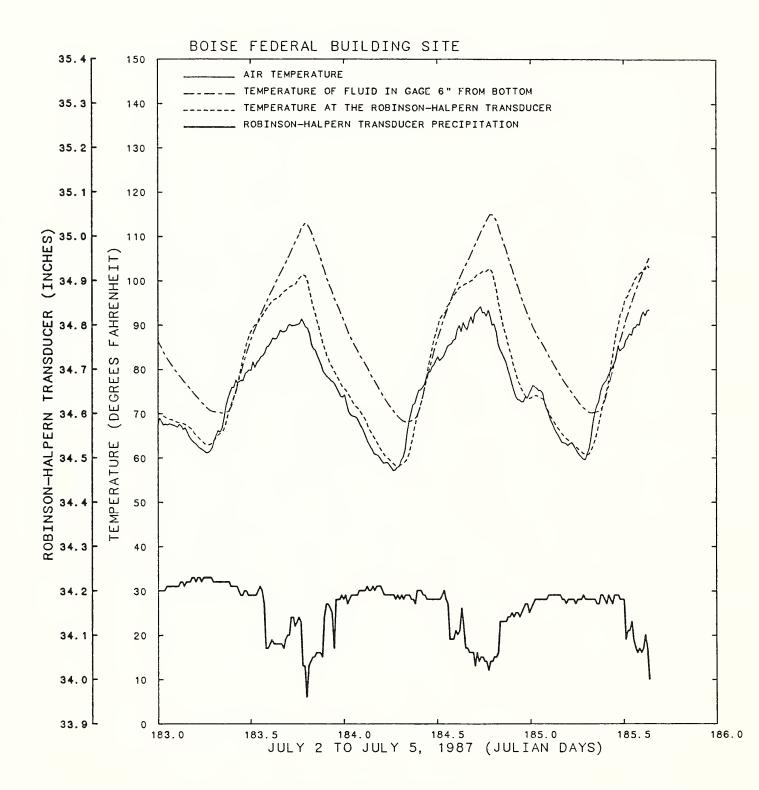


Figure 5. Temperature and pressure transducer records from the simulated SNOTEL site near the Boise Federal Building. All valves open - 30% Glyco-Meth - 31.0 inch fluid depth, July 2 to July 5, 1987.

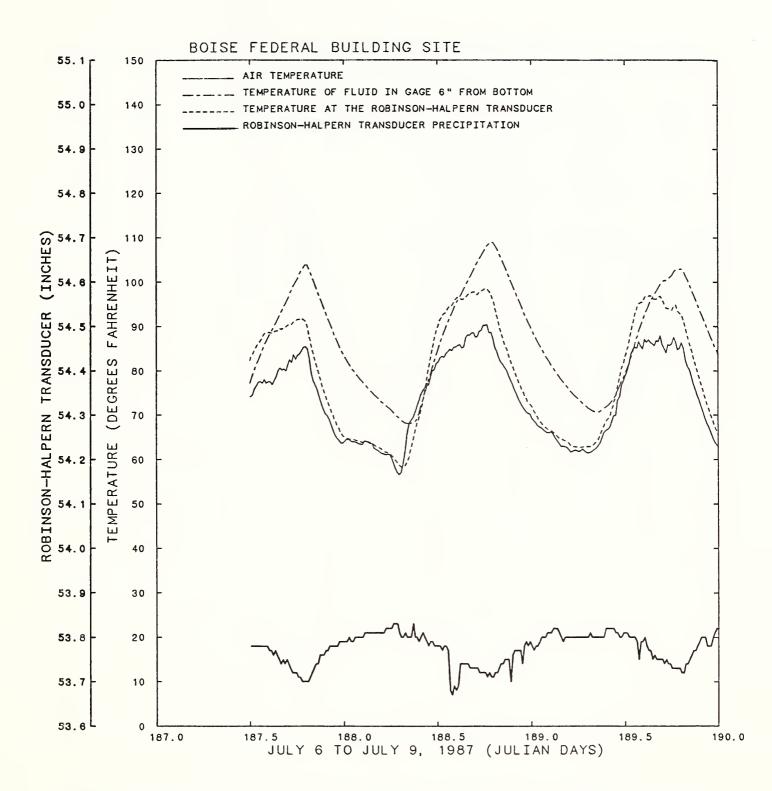


Figure 6. Temperature and pressure transducer records from the simulated SNOTEL site near the Boise Federal Building. All valves open - 18% Glyco-Meth - 51.5 inch fluid depth, July 6 to July 9, 1987.

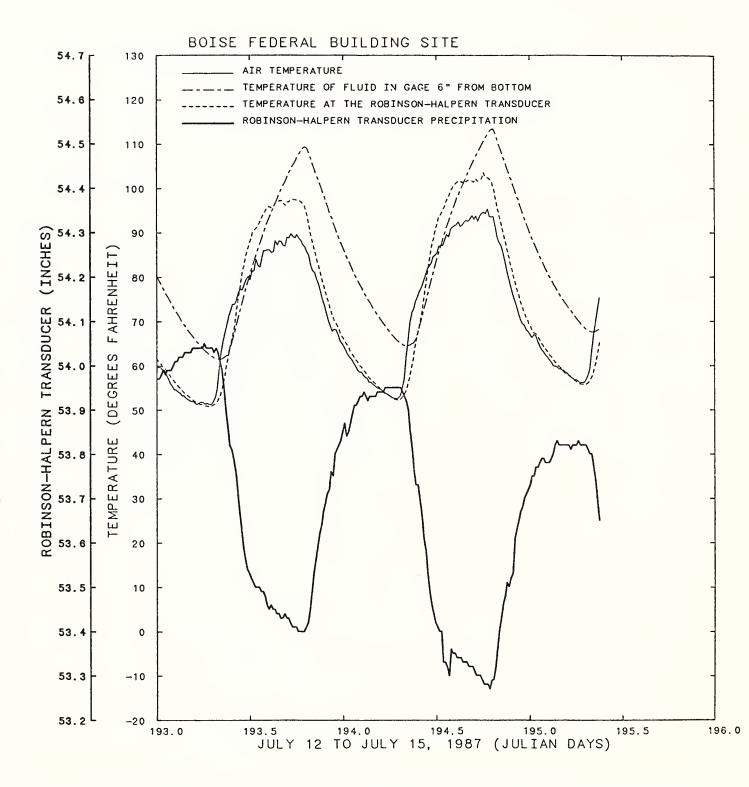


Figure 7. Temperature and pressure transducer records from the simulated SNOTEL site near the Boise Federal Building. Line valve closed - 18% Glyco-Meth - 51.5 inch fluid depth, July 12 to July 15, 1987.

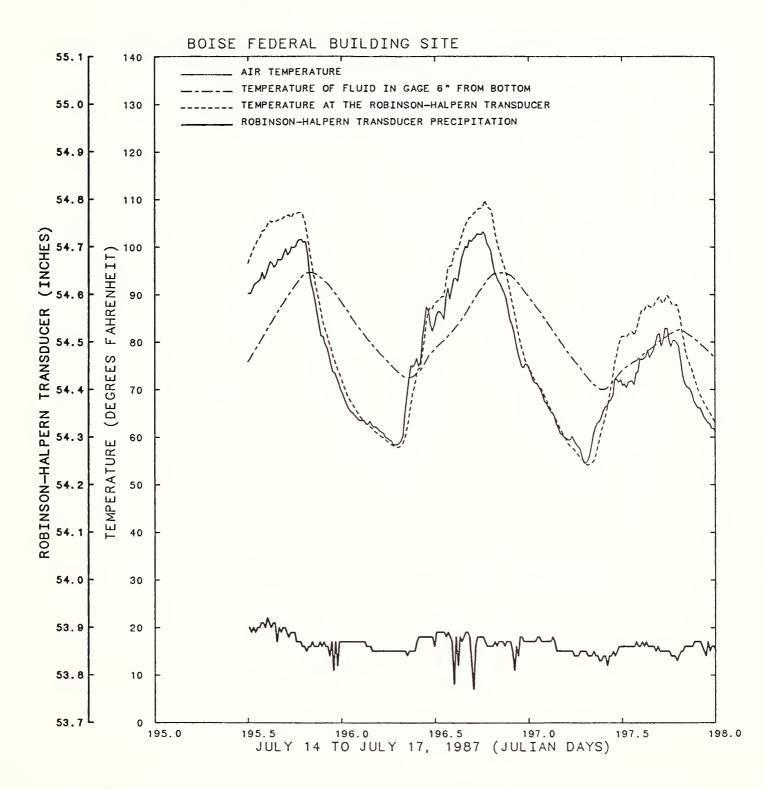


Figure 8. Temperature and pressure transducer records from the simulated SNOTEL site near the Boise Federal Building. All valves open - 18% Glyco-Meth - 51.5 inch fluid depth - galvanized shield, July 14 to July 17, 1987.

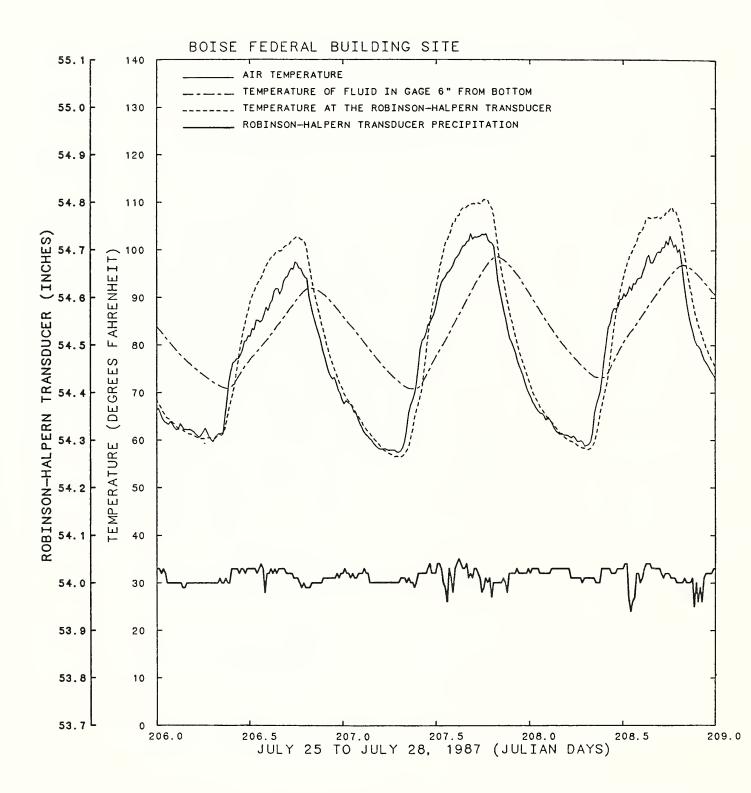


Figure 9. Temperature and pressure transducer records from the simulated SNOTEL site near the Boise Federal Building. All valves open - 18% Glyco-Meth - 51.5 inch fluid depth - brown shield, July 25 to July 28, 1987.

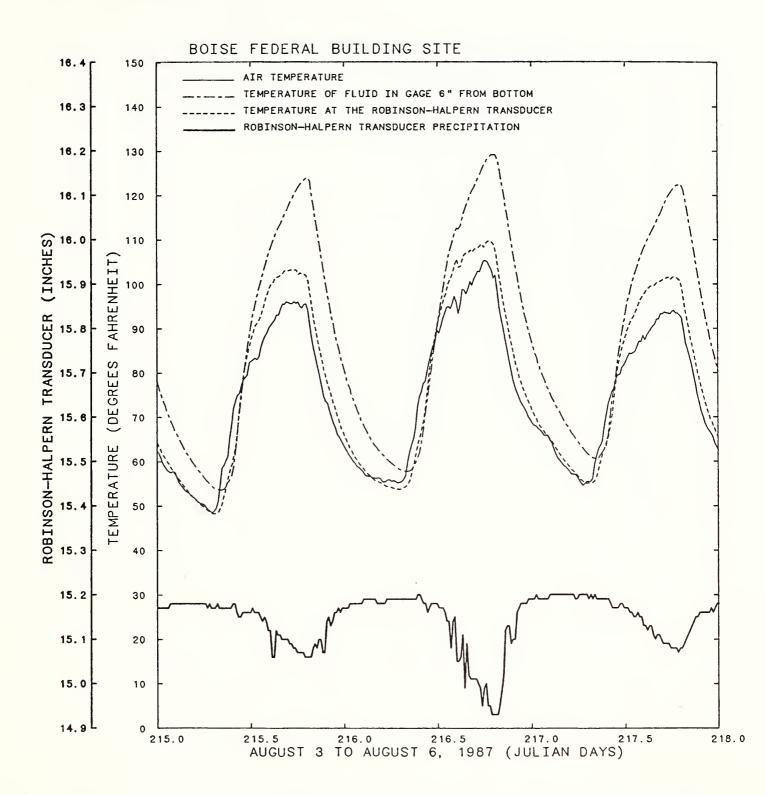


Figure 10. Temperature and pressure transducer records from the simulated SNOTEL site near the Boise Federal Building. All valves open - 100% Ethylene Glycol - 12.0 inch fluid depth, August 3 to August 6, 1987.

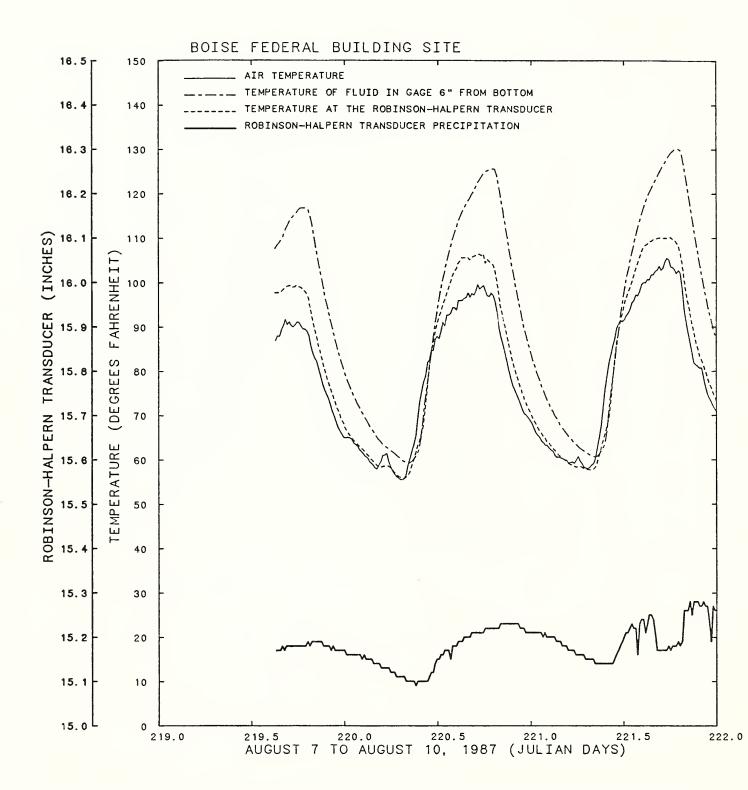


Figure 11. Temperature and pressure transducer records from the simulated SNOTEL site near the Boise Federal Building. Line valve closed - 100% Ethylene Glycol - 12.0 inch fluid depth, August 7 to August 10, 1987.

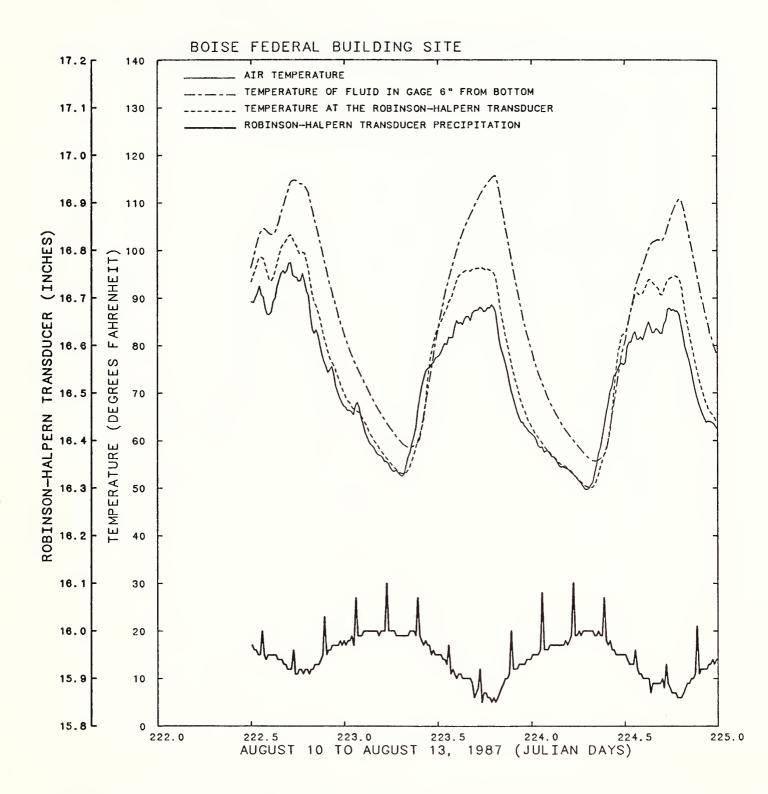


Figure 12. Temperature and pressure transducer records from the simulated SNOTEL site near the Boise Federal Building. All valves open - 40% Methanol and 60% water - 13.0 inch fluid depth, August 10 to August 13, 1987.

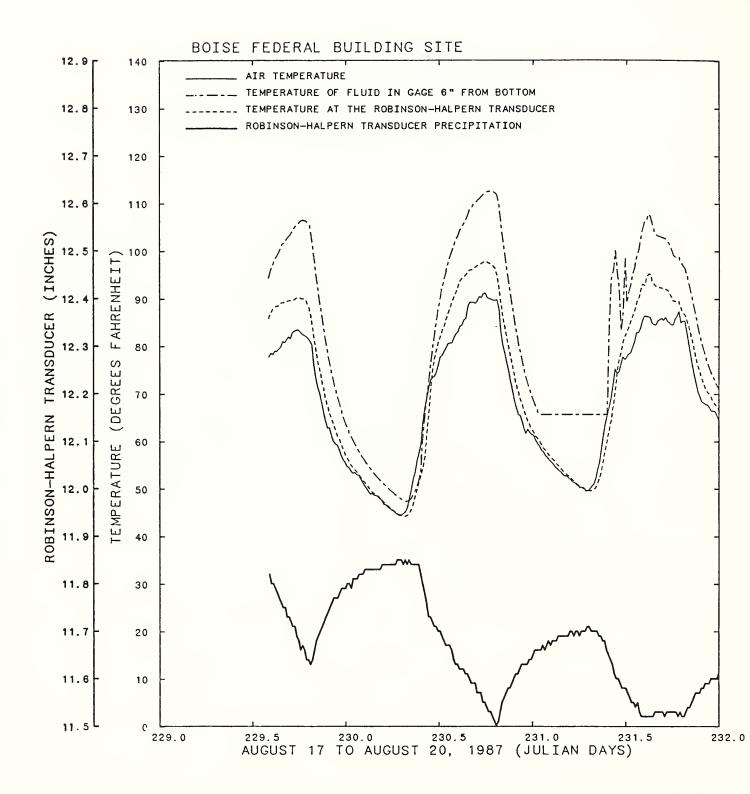


Figure 13. Temperature and pressure transducer records from the simulated SNOTEL site near the Boise Federal Building. All valves open - 100% Glyco-Meth - 8.5 inch fluid depth, August 17 to August 20, 1987.

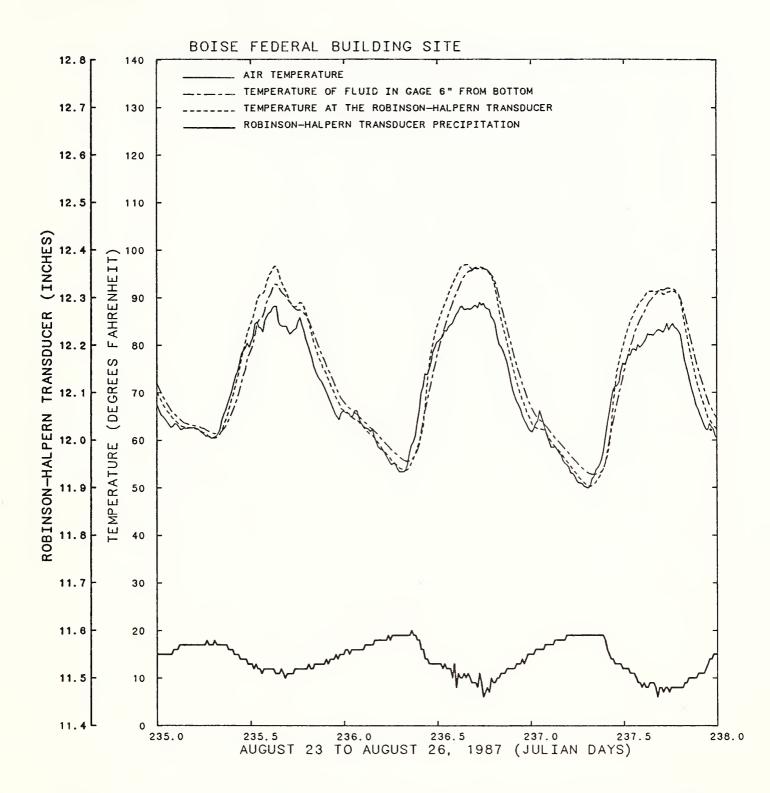


Figure 14. Temperature and pressure transducer records from the simulated SNOTEL site near the Boise Federal Building. All valves open - 100% Glyco-Meth - 8.5 inch fluid depth - gage painted white, August 23 to August 26, 1987.

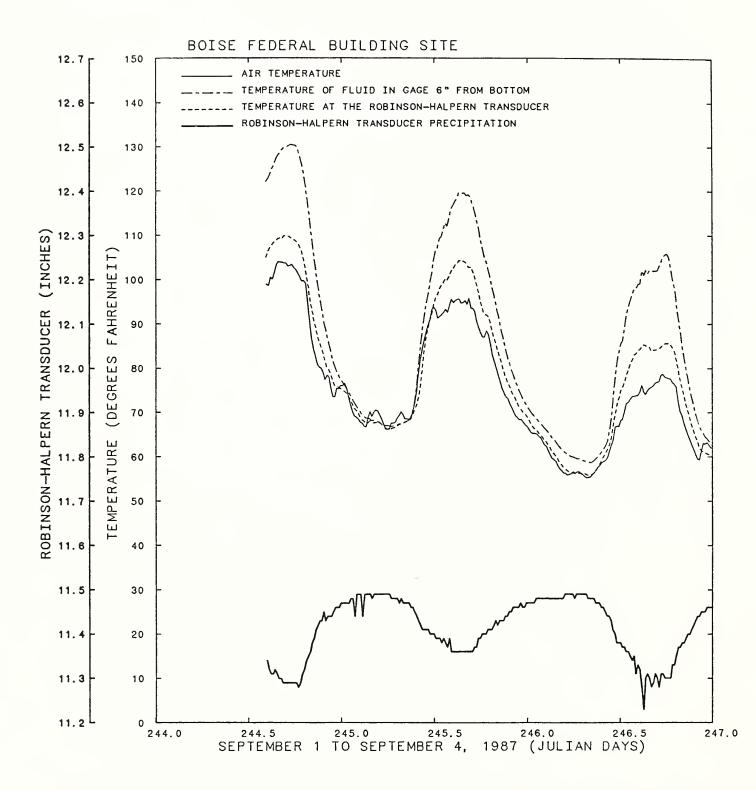


Figure 15. Temperature and pressure transducer records from the simulated SNOTEL site near the Boise Federal Building. All valves open - 100% Glyco-Meth - 8.5 inch fluid depth - gage painted brown, September 1 to September 4, 1987.

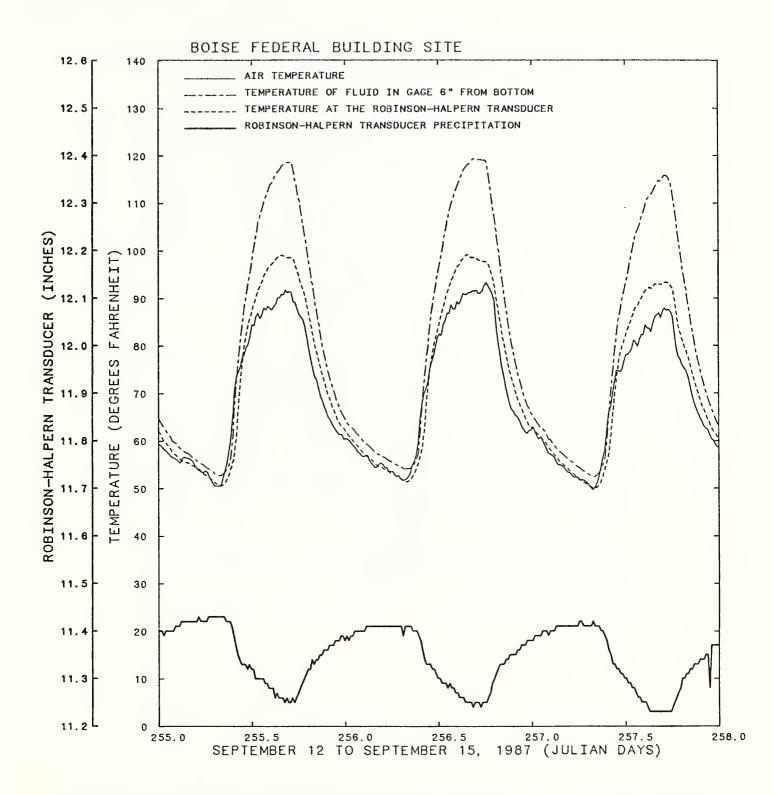


Figure 16. Temperature and pressure transducer records from the simulated SNOTEL site near the Boise Federal Building. All valves open - 100% Glyco-Meth - 8.5 inch fluid depth - gage painted brown, September 12 to September 15, 1987.

On June 15, 1987 the Bureau of Reclamation Data Platform (DCP) was replaced by an Omni Data acquisition system (DAS) with no discernable changes in pressure patterns or magnitudes being observed.

Another interesting feature shown in the figures is the effect on the transducer response brought about by changes at the precipitation gage. For example, alterations that changed the thermal regime of the gage, such as an insulating paint, shielding, or insulation (used last year), reduced the diurnal fluctuation considerably (Figs. 2, 8, 9, 13, 14, 15, 16). The shielding consisted of a sheet metal cylinder about 5 inches in radius larger than the precipitation gage, which covered all but approximately 16 inches at the top and bottom, thus allowing air to circulate between the two. The insulating paint is a flexible coating containing small ceramic insulating beads which is being used on SCS SNOTEL instrument shelters in Idaho. Both white and brown colors were used in the tests, and references to white or brown in the discussions, figures, or tables refer to this paint rather than the standard brown paint normally used to paint the precipitation gages.

The effects of shielding and insulating paint on the thermal regime of the precipitation gage and the fluid in the gage are seen in Figures 17-21. These figures show the relationship between air temperature, fluid temperature 6 inches above the botton of the fluid, and the outer surface skin temperature of the gage on the north and south sides at the fluid level. Figure 17 shows the temperature relationships for a standard gage configuration. Note that the fluid and gage temperatures are about the same as air temperature during the early mornings when minimum temperatures occur. In the afternoons, however, when maximum temperatures occur, fluid and gage temperatures are considerably higher than air temperature (as much as 30 °C).

Figures 18 and 19 show the same temperatures when the gage was shielded. In this case, the fluid and gage temperatures experience a diurnal range in temperature less than air temperature, being both cooler in the afternoons and warmer in the mornings. The color of the shield does not seem to make any difference in temperature relationships, indicating that the insulating effects and air movement between the gage and the shield are the important features.

After removing the shield, the gage was painted white, using an insulating paint (Figure 20). Gage and fluid temperatures are similar to air temperature under these conditions, except for a few hours during the afternoon when they are somewhat higher (about 10 °C). The insulating value of the paint appears to be minimal in this application however, since the temperature relationships were similar to those shown in Figure 17 when the gage was painted brown even though the insulating paint was again used (Figure 21). The white color was therefore responsible for the reduced fluid and gage temperatures noted in Figure 20, because of its reflective properties.

Calculations of the expected change in pressure due to temperature effects on the transducer, and expansion of the system are presented in Tables 2 and 3 for 36 different study periods conducted during the past two years at the Boise simulated SNOTEL site. These calculations

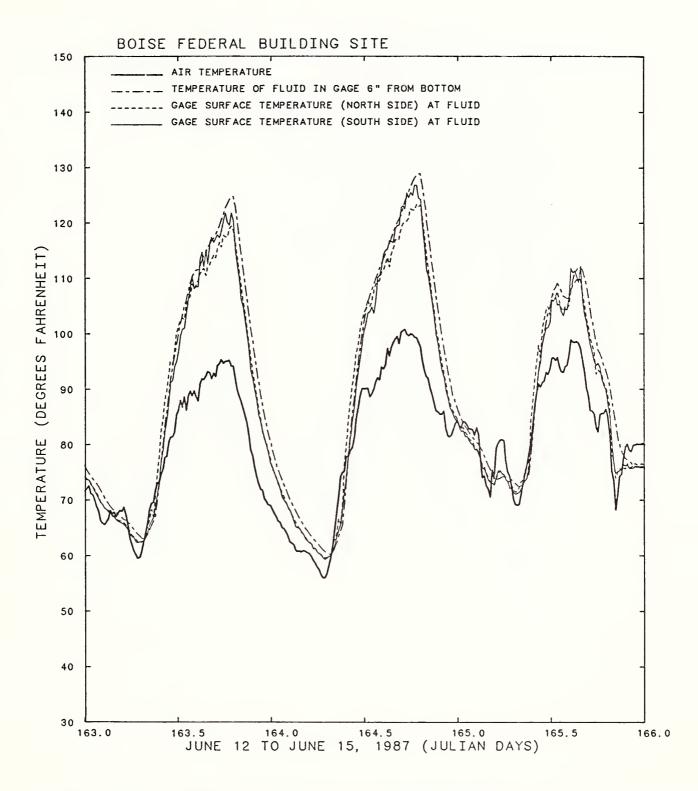


Figure 17. Temperature records from the simulated SNOTEL site near the Boise Federal Building - standard precipitation gage, June 12 to June 15, 1987.

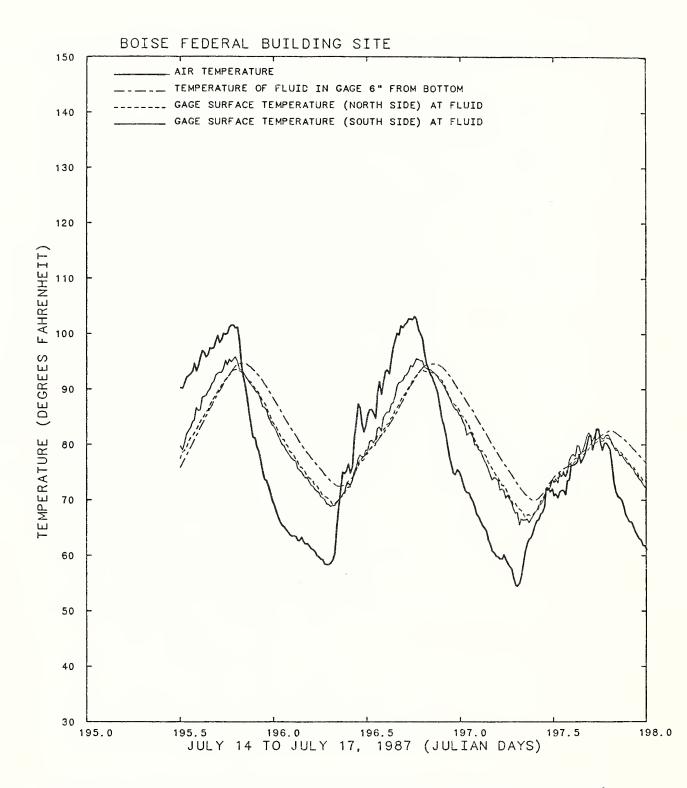


Figure 18. Temperature records from the simulated SNOTEL site near the Boise Federal Building - galvanized shielded gage, July 14 to July 17, 1987.

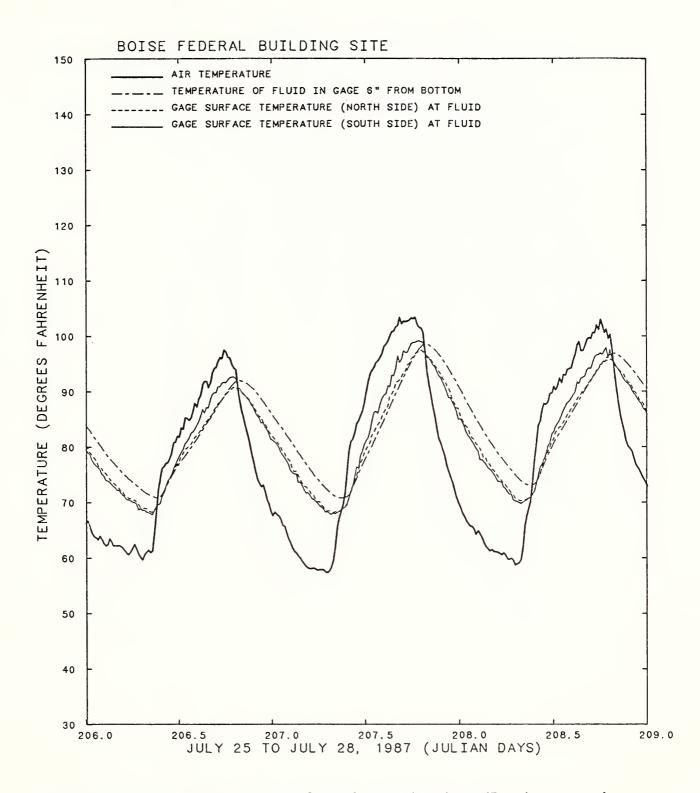


Figure 19. Temperature records from the simulated SNOTEL site near the Boise Federal Building - brown shielded gage, July 25 to July 28, 1987.

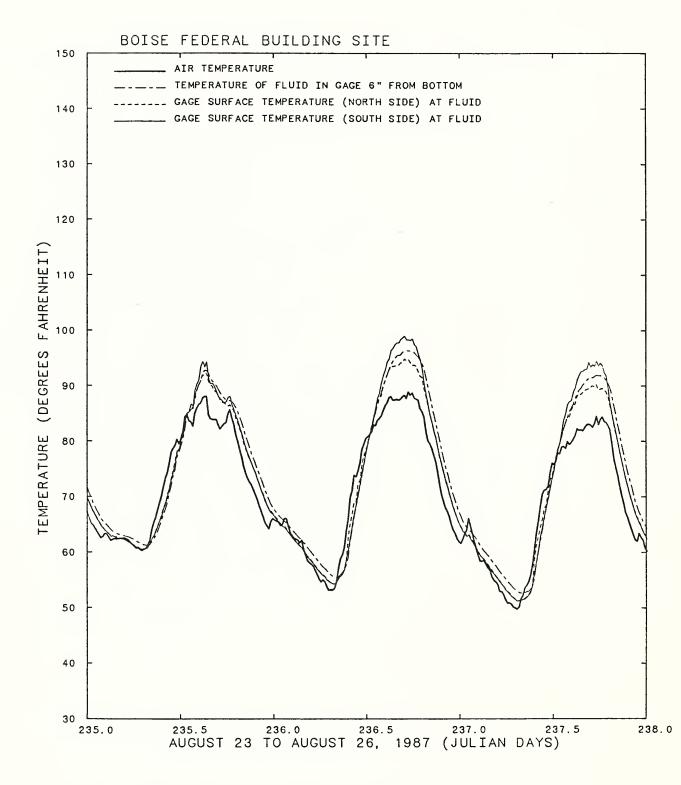


Figure 20. Temperature records from the simulated SNOTEL site near the Boise Federal Building - white insulating paint on gage, August 23 to August 26, 1987.

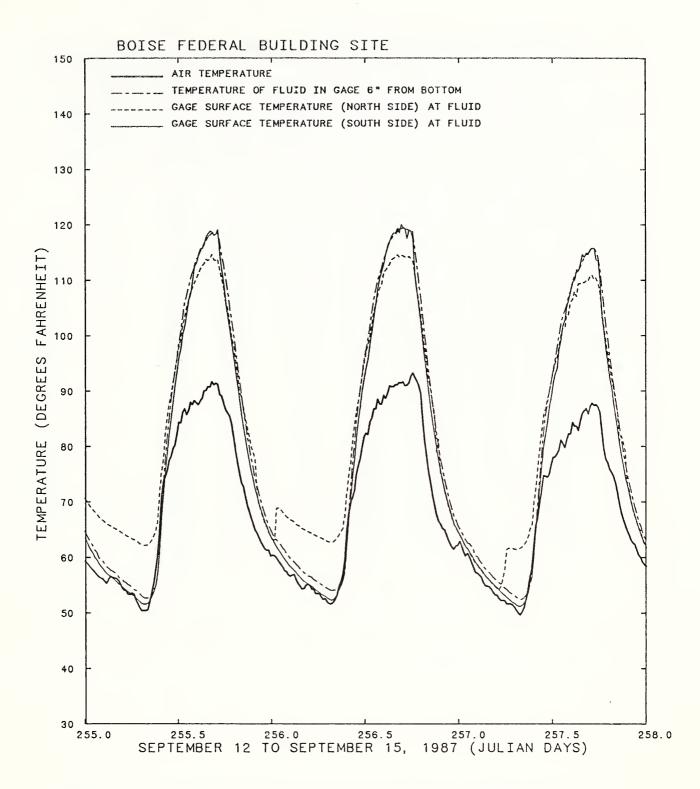


Figure 21. Temperature records from the simulated SNOTEL site near the Boise Federal Building - brown insulating paint on gage, September 12 to September 15, 1987.

Table 2. Comparison of observed and calculated diurnal pressure changes for a simulated remote precipitation gage system in Boise, Idaho. All valves are open.

		Percent			Pressure (Change (inches of	water)	
Date	&	Methyl-Glycol	Fluid		Transducer				-
(Julian	Day)	in Mixture	Depth	Computed	Correction	Total	Observed	Difference	Remarks
			(inches)	1/	2/	3/	4/	<u>5</u> /	
6-10-86	(161) 100	9.0	03	12	15	 37	22	
9-15-86	(258	100	9.0	02	08	10	30	20	
9-23-86	(266	100	9.0	03	12	15	32	17	
8-18-87	(230) 100	8.5	02	+.11	+.09	30	 39	
8-24-87	(236	100	8.5	01	+.08	+.07	13	20	Painted white
9-2-87	(245	100	8.5	02	+.07	+.06	13	19	Painted brown
9-13-87	(256) 100	8.5	02	+.10	+.08	16	24	Painted brown
6-13-87	(164) 95	10.5	03	+.10	+.07	22	29	
10-13-86	5 (286) 85	11.0	03	12	15	25	10	
10-29-86	5 (302) 85	11.0	03	+1.16	+1.13	+.56	57	Moores Creek
									transducer
6-19-86	(170) 50	19.5	05	09	14	30	16	
7 - 3 <i>-</i> 87	(184) 30	31.0	06	+.06	0	17	17	
7-2-86	(183) 25	35.5	09	05	14	25	11	
7-23-86	(204) 25	35.5	07	05	12	12	0	Gage insulated
7-7-87	(188) 18	51.5	09	+.06	03	10	07	
7-15-87	(196) 18	51.5	05	+.08	+.03	+.02	01	Galvanized shield
7-26-87	(207) 18	51.5	06	+.09	+.03	01	04	Brown shield
8-3-86	(215) 0	35.0	07	05	12	08	+.04	Insulated
8-16-86	(228) 0	35.0	08	04	12	13	01	
8-20-86	(232) 0	35.0	10	05	15	15	0	Recorder on top
8-31-86	(243		9.0	03	10	13	16	03	
8-4-87	(216		12.0	03	+.08	+.05	20	25	
8-11-87	(223) 40 7/	13.0	04	+.08	+.04	13	17	

 $[\]frac{1}{2}$ Change in pressure head caused by expansion of the precipitation gage system.

 $[\]frac{2}{}$ Change In pressure head caused by temperature effects on the transducer as determined from laboratory tests.

 $[\]frac{3}{}$ Sum of $\frac{1}{}$ and $\frac{2}{}$.

 $[\]frac{4/}{}$ Change In pressure recorded by DAS or DCP.

 $[\]frac{5}{}$ Difference of $\frac{4}{}$ minus $\frac{3}{}$.

 $[\]frac{6}{}$ 100% ethylene glycol.

 $[\]frac{7}{}$ 40% methyl alcohol - 60% water.

Table 3. Comparison of observed and calculated diurnal pressure changes for a simulated remote precipitation gage system in Boise, Idaho. Line valve between gage and shelter closed except as noted.

		Percent			Pressure C	hange (inches of	water)	_
Date	&	Methyl-Glycol	Fluid		Transducer				
(Julian	Day)	in Mixture	Depth	Computed	Correction	Total	Observed	Difference	Remarks
			(inches)	1/	<u>2/</u>	<u>3/</u>	4/	<u>5/</u>	
5 - 25 - 87	(176)	95	11	07	+.10	+.03	+•25	+.22	-
10-15-86	(288)	85	11	55	11	66	+3.18	+3.84	
5 - 26 - 86	(177)	50	20	16	09	25	- .05	+.20	
7-17-86	(198)	25	35	29	05	34	17	+.17	
7 - 28-86	(209)	25	35	25	05	30	09	+.21	Insulated
7-13-87	(194)	18	51.5	29	+.08	21	 67	46	
3 - 9-86	(221)	0	35	26	06	32	 19	+.13	Insulated
3 - 24-86	(236)	0	35	24	05	29	14	+.15	Recorder on to
9-3-86	(246)		9	12	11	23	 15	+.08	
3 - 8-87	(220)	100 <u>6/</u>	12	08	+.10	+.02	+.10	+.08	100% ethylene glycol
5-13-86	(164)	100	9	13	12	 25	+.31	+.56	Gage valve closed
5 - 27 - 87	(178)	95	10.5	10	+.09	01	+.21	+.22	Gage valve closed
10-8-86	(281)	85	11	83	10	 93	+5.16	+6.09	Gage valve closed

 $[\]frac{1}{2}$ Change In pressure head caused by expansion of the precipitation gage system.

 $[\]frac{2}{}$ Change in pressure head caused by temperature effects on the transducer as determined from laboratory tests.

 $[\]frac{3}{}$ Sum of $\frac{1}{}$ and $\frac{2}{}$.

 $[\]frac{4/}{}$ Change in pressure recorded by DAS or DCP.

 $[\]frac{5}{}$ Difference of $\frac{4}{}$ minus $\frac{3}{}$.

 $[\]frac{6/}{100\%}$ ethylene glycol.

followed the same procedure and theory presented in last year's report (See ARS-SCS Annual Progress Report No. 6, December 1986). The calculations were made for one day of a 3 to 10 day period during which time the fluid and system conditions were unchanged. The expected change in pressure transducer readings due to observed temperature changes was calculated as a function of the expansion characteristics of the precipitation gage system components plus the change in transducer readings with temperature as established by laboratory testing. In all cases, the calculations were made for the time from minimum temperature readings (early morning) to maximum temperature readings (late afternoon). The precipitation gage and most of the plumbing lines were generally expanding during this period which causes a reduction in pressure head, thus all of the computed changes have a negative sign.

The transducer corrections, on the other hand, depend on the transducer characteristics, and can be positive or negative. The transducer used for most of 1986 exhibited a negative response (decrease) to temperature increase, while the transducer used in 1987 had a positive (increase) response. A transducer which showed considerable diurnal fluctuation at the Moores Creek Summit, Idaho SNOTEL site, was installed at the Boise simulated SNOTEL site for the 10-29-86 period. As noted in Table 2, the transducer correction factor for this transducer, which is based on laboratory tests, was much larger than for either of the other transducers used. Thus, much of the fluctuation observed in the previous Moores Creek readings was due to temperature sensitivity of this transducer. This was further substantiated when later readings from Moores Creek using a different transducer showed much smaller fluctuations.

Examination of Table 2 reveals that except for two periods (10-29-86) and (7-15-87), the effect of temperature on the expansion of the system was greater than its effect on the transducer. Thus, the observed pressure changes based on transducer readings were generally negative, that is as temperature increased, pressure decreased (see observed pressure change). Calculated changes in pressure were less than observed changes for all but one day (8-3-86), where a very minor difference was determined.

The information in Table 2 is presented as a function of the amount of methyl alcohol-ethylene glycol in the mixture (from 100% to 0%). During the last two periods shown at the bottom of Table 2, the fluid consisted of 100 percent ethylene glycol or a mixture of methyl alcohol and water. These two cases were included to determine the response characteristics of the two compounds separately. As noted, they both produced essentially the same results. The arrangement of study periods as a function of percent methyl alcohol-ethylene glycol was selected, because it was noted that the difference between calculated and observed pressure change was larger for the higher percentages of this compound. For mixtures with methyl alcohol-ethylene glycol of 25 percent or less, differences between calculated and observed pressure changes are probably as small as could be expected considering measurement and calculation errors.

Since the fluid characteristics should have no effect on the pressure change (i.e., changes in density due to temperature changes are compensated by changes in volume; therefore, the weight of a column of fluid or the pressure would remain the same), it appears that the methyl alcohol-ethylene glycol is affecting the transducer in some way. Efforts to determine this influence have, however, not been successful. In any case, by spring when the temperature changes appear to cause the greatest diurnal fluctuations, the percent of methyl alcohol-ethylene glycol in the precipitation gage should be the smallest because it is diluted by winter precipitation. Therefore, if good pressure transducers are being used and temperature corrections are being applied, the adjusted readings should be reliable.

Table 3 contains results similar to those in Table 2, except the line valve or gage valve are closed (Fig. 1). Differences between calculated and observed pressure changes are greater under these conditions than for the open system. The larger differences may be partially due to calculation and measurement errors associated with the considerably smaller volumes and areas involved when the precipitation gage reservoir is shut off from the transducer side of the system. It is interesting that the calculated changes are greater than observed changes in all but one case, which is opposite of the results shown in Table 2 for the open system. Only the calculations for the periods with 100 percent water or ethylene glycol were within acceptable limits.

Two periods are of particular interest because of the extremely large differences between observed and calculated pressure change (10-15-86 and 10-8-86). The calculated pressure changes for these two periods indicated a large decrease due to system expansion and transducer effects; however, observed readings showed a very large increase in pressure. Since these results were representative of 3 or more days, it does not appear to be caused by random noise or error in readings. Careful study of the various temperatures and system conditions did not suggest a cause for these uncharacteristic values. Since a system with either valve closed is not representative of field conditions, these results, while intended to aid in isolating the problem, are probably of little value.

Table 4 contains a comparison of computed and observed changes in manometer readings due to expansion of the system and the various fluids. Since the fluids have considerably greater coefficients of thermal expansion than the materials in the system, the manometer readings increase with increasing temperature. Computed changes were greater than observed about 70 percent of the time. All of the differences except one (7-26-87) were 0.27 inches or less, and most were less than 0.19 inches, which is estimated to be within maximum calculation and measurement error limits. Examination of temperature patterns and magnitudes did not reveal any obvious reason for the dramatic change in manometer readings noted during the 7-26-87 period. Since expansion characteristics of the various fluids are considered in the calculations, as long as the various expansion coefficents are known, there should not be any pattern or tendency for differences to be greater or less for any given fluid. This, in fact, appeared to be the case and the magnitude of the differences for both manometers seemed to

Table 4. Comparison of computed and observed manometer readings for the shelter and gage manometers (Inches). All valves are open except as noted.

			Change in Manometer Reading During the Day								
Date &	ξ.	Percent		Shelte			Gage		_		
(Julian	Day)	Methyl-Glycol	Computed	0bserved	Difference	Computed	Observed	Difference	Remarks		
3-18-87	(230)	100				+.28	+.13	15			
3-24-87		100	+.18	+.06	12	+.18	+.16	02	White		
9-2-87	(245)	100	+.22	+.03	19	+.22	+.09	13	Brown		
5-13 - 87	(164)	95	+.33	+.19	14	+.33	+.31	02			
7-3-87	(184	30	+.74	+.72	02	+.28	+.44	+.16			
7-2- 86	(183)	25	+.38	+.34	04						
-23-86	(204)	25	+.30	+.50	+.20				Insulated		
7-7-87	(188)	18	+.92	+.94	+.02	+.31	+.53	+.22			
7-15-87	(196)	18	+.67	+.41	 26				Galvanized shield		
7-26-87	(207)	18	+.57	+1.44	+.87				Brown shiel		
3-16-86	(228)	0	+.13	+.16	+.03						
3-20-86	(232)	0	+.16	+.28	+.12				Recorder on		
3-11-87	(223)	40% methanol 60% water	+.21	+.13	08	+.21	+.19	 02			
3-4-86	(216)	100% ethylene glycol	+.26	+.19	07	+.26	+.25	01			
-25-87	(176)	95	+.64	+.56	08	+.33	+.25	08	Valve close		
-26-86	(177)	50	+.44	+.44	0				Valve close		
7-13-87	(194)	18	+.81	+.75	06	+.38	+.63	+.25	Valve close		
3-8-87	(220)	100% ethylene glycol	+.40	+.31	09	+.24	+.19	05	Valve close		
5 -13- 86	(164)	100	+.64	+.69	+.05				Gage valve closed		
5-27-87	(178)	95	+1.02	+.75	 27	+.31	+.19	12	Gage valve closed		

be random which suggested noise in the data. If this is the case, these calculations would tend to act as a check on the theory and procedures used in all of the calculations, and would therefore strengthen the conclusions obtained using Table 2 results.

The magnitude of the difference between observed and calculated manometer change could be affected by timing of the manometer observations. Although calculated values were based on the period from minimum temperature to maximum temperature, manometer readings were taken in the early morning and late afternoon. Temperature during the early morning did not change dramatically from its minimum value, but afternoon temperatures varied considerably with maximums occurring as early as 4:00 p.m. and as late as 9:00 p.m. Therefore, the time period used in the calculations did not necessarily coincide with the time period between manometer readings, and could be the cause of some of the differences noted.

A comparison of results shown in Tables 2, 3, and 4 indicates that periods with large differencs between observed and calculated pressure did not coincide with periods of large differences between observed and calculated manometer changes.

Recommendations

The changes most likely to reduce diurnal fluctuations in precipitation gage readings based on tests conducted at the simulated SNOTEL site, in order of priority, are:

- 1. Exchange the pressure transducer with one of known thermal characteristics determined by laboratory tests.
- 2. Change the thermal regime of the precipitation gage using; a) shielding, b) insulation, or c) light colored insulating paints.
- 3. Change the characteristics of the anti-freeze solution.
- 4. Change the design of the precipitation gage.

Field tests of the first two recommendations should be conducted before considering items 3 and $4 \cdot$

B. Transducer Response in Laboratory and Field Tests

The analysis presented in the previous section indicated that temperature effects on the system, the transducer, and the fluid could account for the magnitude of diurnal fluctuations observed at the simulated SNOTEL site (see Table 2). If the same relationships were valid for field sites, a correction could be applied which should eliminate the diurnal fluctuations. To check this hypothesis, a study was initiated that consisted of an analysis of SNOTEL data and laboratory testing of the pressure transducers used.

The first part of the study involved collecting data from all 517 SNOTEL sites during a precipitation-free period in June of 1987, at a frequency of four or more readings per day. These data were analyzed to determine the magnitude of the observed pressure change and its relationship to the observed temperature at the site. Those stations which exhibited a diurnal pressure fluctuation greater than that permitted by the pressure transducer specifications were then identified. The next step was to obtain new transducers from the factory and to establish a relationship between temperature and transducer output for a specified pressure and temperature range. These new transducers were then installed at the field sites identified above where possible.

The next phase of the study involved laboratory testing of the old transducers removed from the field sites to establish their temperature-pressure relationships. Also, data from the field sites with the new transducers installed were obtained during a precipitation-free period in October 1987. The data were again analyzed to determine the magnitude of the diurnal pressure fluctuations as a function of site temperature.

In all, 20 new pressure transducers were tested in the laboratory. However, because the transducers were received late in the year, after most of the field sites had been visited and recharged in preparation for winter snows, only seven new transducers were installed at known sites and only eight of the old transducers were submitted to the laboratory for testing.

Laboratory tests and field data were available for both old and new transducers from only four sites in Idaho. The transducer indentification numbers and their locations during June and October 1987 are shown in Table 5. The laboratory test results showing the transducer outputs for a range of temperatures and pressures are presented in Tables 6-13.

Analysis of the data from the SNOTEL sites is presented in Section C. Using the results presented and the offsets obtained from SCS, the depth of the fluid in the gage, the approximate concentration of methyl alcohol-ethylene glycol in the mixture, and the change in pressure with temperature were determined. Using the laboratory test results, the relationship between pressure and temperature for each transducer was developed. Since this relationship was found to vary with pressure head, it was necessary to develop the relation for a range of depths or heads, and interpolate for actual depths. The approximate depth

Table 5. Transducers located at selected field SNOTEL sites in Idaho during June and October 1987, and the regression parameters developed from SNOTEL and laboratory temperature and pressure data.

	Slope	0.032	0.017
Creek	Intercept	26.70	5.12 5.20
Moores Creek	Transducer Intercept Slope Transducer Intercept Slope	338	1401
	Slope	0.043	0.016
Banner Summit	Intercept	13.00	16.52 16.35
Ban	Transducer no.	290	1406 1406
	Slope	0.042	0.002
Vienna Mine	Intercept	59,39	29.28 29.28
Vien	Transducer no.	139	1394
	Slope	-0.036	0.014
Stickney Mill	Intercept	19,95	25 _. 37 25 _. 38
Stic	Month Data Transducer Intercept Slope no.	009	1400
	Data	SNOTEL	SNOTEL
	Month	NUC	00.1

Table 6. Test of pressure transducer output as a function of temperature for Robinson-Halpern transducer, serial no. 139.

MODEL: 159AW215DV35BS

SERIAL NO.: 139

RANGE: 0 - 150 INCHES H₂O

SUPPLY: 7.50 VDC OUTPUT: 0-5 VDC

CONDITION: USED - OUTPUT SLOW TO STABILIZE AFTER PRESSURE CHANGE

ADJUSTMENTS: NONE

INPUT PRESSURE (INCHES H ₂ C	D) 0" 20" 40" 60" 80" 100" 110" 120" 130" 150" TRANSDUCER OUTPUT												
TEST TEMPERATURE	-		======			ER OUTI	PUT			:=====			
		21.60											
40 C	1.53	21.42	41.79¦	62.16	81.84	101.88	112.14	122.22	131.88	151.65			
30 C	3.57	22.08	41.88	62.01	82.08	101.94	111.69	121.95	131.85	151.35			
20 C	1.29	21.21	41.40	61.32	81.54	101.43	111.51	121.71	131.76	150.87			
10 C	.90	21.00	41.01;	61.32	81.15	101.40	111.18	121.05	131.10	150.78			
0 C	1.44	20.64	40.83	61.05	80.79	100.65	110.55	120.42	130.41	150.00			
- 5 ℃	•93¦	20.58	40.50	60.63	80.61	100.32	110.07	119.79	130.11	149.22			
-10 C	.90	20.34	40.471	60.54	80.61	100.50	110.16	119.99	129.78	149.44			
- 15 ℃	.45	20.28	40.23	60.33	80.25	100.24	110.10	119.74	129.57	149.16			
			- 1	-									

- 1. THE TRANSDUCER WAS PLACED IN A FREAS MODEL 815 INCUBATOR AND THE TEMPERATURE WAS ALLOWED TO STABILIZE FOR 30 MINUTES BEFORE READING TRANSDUCER OUTPUT.
- 2. DRUCK MODEL DP1600 DIGITAL PRESSURE INDICATOR WAS USED AS THE PRESSURE REFERENCE AND WAS OPERATED AT ROOM TEMPERATURE UTILIZING AIR AS THE PRESSURE MEDIUM.
- 3. FLUKE MODEL 8050A 4-1/2 DIGIT MULTIMETER WAS USED FOR TRANSDUCER OUTPUT VOLTAGE MEASUREMENT.
- 4. THE 7.50 VOLT SUPPLY VOLTAGE WAS APPLIED TO THE TRANSDUCER DURING MEASUREMENT ONLY AND WAS DISCONNECTED DURING TEMPERATURE STABILIZATION.
- 5. THE 7.50 VOLT SUPPLY WAS CHECKED BEFORE EVERY MEASUREMENT AND WAS MAINTAINED AT 7.50 VOLT +/-.005 VOLT.
- 6. THE PRESSURE WAS INCREASED TO THE TEST VALUES WITHOUT OVERSHOOT TO MINIMIZE THE EFFECTS OF HYSTERISIS.

Table 7. Test of pressure transducer output as a function of temperature for Robinson-Halpern transducer, serial no. 290.

MODEL: 159AW210DV35BS

SERIAL NO.: 290

RANGE: 0 - 100 INCHES H20

SUPPLY: 7.50 VDC OUTPUT: 0-5 VDC CONDITION: USED ADJUSTMENTS: NONE

INPUT PRESSURE (INCHES H ₂ C)) 0"		20"						80"	100"
TEST TEMPERATURE				Т	RANSDUC (INCHE	ER OUTF S H ₂ O)	PUT	======	======	======
		10.68								
40 C	•54	10.60	20.70	30.72	40.74	50.72	60.76	70.74	80.72	100.72
30 C	.341	10.46	20.54	30.58	40.64	50.62	60.62	70.641	80.56	100.56
20 C	.20	10.32	20.42	30.46	40.46	50.46	60.44	70.44	80.42	100.38
10 C	.08	10.20	20.24	30.28	40.32	50.30	60.30	70.28	80.26	100.22
0 C	04	10.02	20.14	30.16	40.16	50.16	60.18	70.18	80.16	100.08
- 5 ℃	081	10.04	20.08	30.08	40.12	50.12	60.10	70.08	80.10	100.04
-10 C	 12¦	9.981	20.02	30.06	40.10	50.12	60.08	70.10	80.04	100.02
- 15 ℃	 18¦	9.92	19.98	30.00	40.02	50.04	60.04	70.00	80.00	99.96
_5 C	08 12 	10.04¦ ¦ 9.98¦ ¦ 9.92¦	20.08; ; 20.02; ; 19.98;	30.08; 30.06; 30.00;	40.12	50.12 50.12 50.04	60.08	70.08 70.10 70.00	80.10 80.04 80.00	100.04 100.02 99.96

- 1. THE TRANSDUCER WAS PLACED IN A FREAS MODEL 815 INCUBATOR AND THE TEMPERATURE WAS ALLOWED TO STABILIZE FOR 30 MINUTES BEFORE READING TRANSDUCER OUTPUT.
- 2. DRUCK MODEL DP1600 DIGITAL PRESSURE INDICATOR WAS USED AS THE PRESSURE REFERENCE AND WAS OPERATED AT ROOM TEMPERATURE UTILIZING AIR AS THE PRESSURE MEDIUM.
- 3. FLUKE MODEL 8050A 4-1/2 DIGIT MULTIMETER WAS USED FOR TRANSDUCER OUTPUT VOLTAGE MEASUREMENT.
- 4. THE 7.50 VOLT SUPPLY VOLTAGE WAS APPLIED TO THE TRANSDUCER DURING MEASUREMENT ONLY AND WAS DISCONNECTED DURING TEMPERATURE STABILIZATION.
- 5. THE 7.50 VOLT SUPPLY WAS CHECKED BEFORE EVERY MEASUREMENT AND WAS MAINTAINED AT 7.50 VOLT +/- .005 VOLT.
- 6. THE PRESSURE WAS INCREASED TO THE TEST VALUES WITHOUT OVERSHOOT TO MINIMIZE THE EFFECTS OF HYSTERISIS.

Table 8. Test of pressure transducer output as a function of temperature for Robinson-Halpern transducer, serial no. 338.

MODEL: 159AW150DV35BS

SERIAL NO.: 338

RANGE: 0 - 50 INCHES H20

SUPPLY: 7.50 VDC OUTPUT: 0-5 VDC CONDITION: USED ADJUSTMENTS: NONE

IN PUT PR ESSURE													
(INCHES H ₂ O) 0" 10" 15" 20" 25" 30" 35" 40" 45" 50"													
TEST TEMPERATURE		TRANSDUCER OUTPUT (INCHES H ₂ O)											
		10.09	15.18	20.28	25.44		35.68						
40 C	.14	10.19	15.29	20.39	25.51¦	30.59	35.68	40.75	45.76	50.77			
30 C ¦	.13	10.22	15.26	20.37	25.42	30.54	35.60	40.65	45.70	50.64			
20 C	.12	10.16	15.23	20.30	25.35¦	30.431	35.48	40.50	45.52	50.47			
10 C	.12	10.08	15.11	20.18	25.22	30.30	35.32	40.371	45.31	50.23			
0 C	.11	10.08	15.10	20.15¦	25.17	30.21	35.25	40.22	45.20	50.09			
- 5 ℃ ¦	.10	10.04	15.10¦	20.13	25.17	30.20	35.21¦	40.20	45.10	50.00			
-10 C	.09	10.03	15.05	20.08	25.10	30.13	35.16	40.16	45.04	49.94			
	.08	10.02	15.03¦	20.04	25.10	30.13	35.12	40.091	45.00	49.87			

- 1. THE TRANSDUCER WAS PLACED IN A FREAS MODEL 815 INCUBATOR AND THE TEMPERATURE WAS ALLOWED TO STABILIZE FOR 30 MINUTES BEFORE READING TRANSDUCER OUTPUT.
- 2. DRUCK MODEL DP1600 DIGITAL PRESSURE INDICATOR WAS USED AS THE PRESSURE REFERENCE AND WAS OPERATED AT ROOM TEMPERATURE UTILIZING AIR AS THE PRESSURE MEDIUM.
- 3. FLUKE MODEL 8050A 4-1/2 DIGIT MULTIMETER WAS USED FOR TRANSDUCER OUTPUT VOLTAGE MEASUREMENT.
- 4. THE 7.50 VOLT SUPPLY VOLTAGE WAS APPLIED TO THE TRANSDUCER DURING MEASUREMENT ONLY AND WAS DISCONNECTED DURING TEMPERATURE STABILIZATION.
- 5. THE 7.50 VOLT SUPPLY WAS CHECKED BEFORE EVERY MEASUREMENT AND WAS MAINTAINED AT 7.50 VOLT +/-.005 VOLT.
- 6. THE PRESSURE WAS INCREASED TO THE TEST VALUES WITHOUT OVERSHOOT TO MINIMIZE THE EFFECTS OF HYSTERISIS.

Table 9. Test of pressure transducer output as a function of temperature for Robinson-Halpern transducer, serial no. 600.

MODEL: 159AW210DV35BS

SERIAL NO.: 600

RANGE: 0 - 100 INCHES H₂0

SUPPLY: 7.50 VDC OUTPUT: 0-5 VDC CONDITION: USED ADJUSTMENTS: NONE

INPUT	======	:======	======	======	:======	:=====	:=====	:=====	=====:	:=====			
PRESSURE (INCHES H ₂ (יי0 (כ	10"	20"	30"	40"	50"	60"	70"	80"	100"			
========	======			======	======	======	======	:======					
TEST	_			T		ER OUTF	PUT						
TEMPERATURI						ES H ₂ 0)							
	•												
50 C	- 1.24		19.32	29.54	39.76	49.94	60.12						
40 C	98	9.34	19.58¦	29.84	40.04	50.22	60.42	70.60	80.76	101.00			
30 C	74	9.60	19.86	30.10	40.30	50.52	60.70	70.82	80.98	101.30			
20 C	48	9.88	20.16	30.36	40.58	50.76	61.00	71.10	81.24	101.48			
10 C	22	10.10	20.381	30.62	40.84	51.06	61.20	71.38	81.52	101.76			
0 C	04	10.30	20.58	30.84	41.06	51.30	61.42	71.60	81.72	101.92			
- 5 ℃	.00	10.32	20.64	30.90	41.10	51.32	61.52	71.64	81.80	102.01			
− 10 C	.04	10.44	20.68	30.96	41.18	51.38	61.56	71.74	81.90	102.10			
	.12	10.46	20.76	31.00	41.22	51.40	61.58	71.76	81.90	102.10			

- 1. THE TRANSDUCER WAS PLACED IN A FREAS MODEL 815 INCUBATOR AND THE TEMPERATURE WAS ALLOWED TO STABILIZE FOR 30 MINUTES BEFORE READING TRANSDUCER OUTPUT.
- 2. DRUCK MODEL DP1600 DIGITAL PRESSURE INDICATOR WAS USED AS THE PRESSURE REFERENCE AND WAS OPERATED AT ROOM TEMPERATURE UTILIZING AIR AS THE PRESSURE MEDIUM.
- 3. FLUKE MODEL 8050A 4-1/2 DIGIT MULTIMETER WAS USED FOR TRANSDUCER OUTPUT VOLTAGE MEASUREMENT.
- 4. THE 7.50 VOLT SUPPLY VOLTAGE WAS APPLIED TO THE TRANSDUCER DURING MEASUREMENT ONLY AND WAS DISCONNECTED DURING TEMPERATURE STABILIZATION.
- 5. THE 7.50 VOLT SUPPLY WAS CHECKED BEFORE EVERY MEASUREMENT AND WAS MAINTAINED AT 7.50 VOLT +/-.005 VOLT.
- 6. THE PRESSURE WAS INCREASED TO THE TEST VALUES WITHOUT OVERSHOOT TO MINIMIZE THE EFFECTS OF HYSTERISIS.

Table 10. Test of pressure transducer output as a function of temperature for Robinson-Halpern transducer, serial no. 1394.

MODEL: 159AW210D35U SERIAL NO.: 1394

RANGE: 0 - 100 INCHES H₂0

SUPPLY: 7.50 VDC OUTPUT: 0-5 VDC CONDITION: NEW ADJUSTMENTS: NONE

INPUT										
PRESSURE (INCHES H ₂ C)) 0"									
TEST TEMPERATURE	===== [======]	RANSDUC	CER OUT	PUT	:======	:=====:	:=====
		10.30								
40 C	.06	10.30	20.481	30.66	40.84	51.02	61.18	71.32	81.34	100.06
30 C ¦	.06	10.32	20.50	30.70	40.88	51.06	61.20	71.32	81.32	100.02
20 C	.02	10.24	20.40	30.56	40.74	50.90	61.04	71.14	81.20	99.88
10 C	08	10.08	20.24	30.42	40.60	50.74	60.88	70.98	81.02	99.66
0 C	22	9.96	20.12	30.30	40.48	50.60	60.72	70.86	80.88	99.50
- 5 ℃ ¦	28	9.86	20.00	30.12	40.20	50.32	60.40	70.46	80.46	99.02
-10 C	 32	9.88	20.04	30.20	40.34	50.50	60.64	70.78	80.76	99.42
	38	9.80	19.98	30.16	40.28	50.42	60.56	70.66	80.68	99.32

- 1. THE TRANSDUCER WAS PLACED IN A FREAS MODEL 815 INCUBATOR AND THE TEMPERATURE WAS ALLOWED TO STABILIZE FOR 30 MINUTES BEFORE READING TRANSDUCER OUTPUT.
- 2. DRUCK MODEL DP1600 DIGITAL PRESSURE INDICATOR WAS USED AS THE PRESSURE REFERENCE AND WAS OPERATED AT ROOM TEMPERATURE UTILIZING AIR AS THE PRESSURE MEDIUM.
- 3. FLUKE MODEL 8050A 4-1/2 DIGIT MULTIMETER WAS USED FOR TRANSDUCER OUTPUT VOLTAGE MEASUREMENT.
- 4. THE 7.50 VOLT SUPPLY VOLTAGE WAS APPLIED TO THE TRANSDUCER DURING MEASUREMENT ONLY AND WAS DISCONNECTED DURING TEMPERATURE STABILIZATION.
- 5. THE 7.50 VOLT SUPPLY WAS CHECKED BEFORE EVERY MEASUREMENT AND WAS MAINTAINED AT 7.50 VOLT +/- .005 VOLT.
- 6. THE PRESSURE WAS INCREASED TO THE TEST VALUES WITHOUT OVERSHOOT TO MINIMIZE THE EFFECTS OF HYSTERISIS.

Table 11. Test of pressure transducer output as a function of temperature for Robinson-Halpern transducer, serial no. 1400.

MODEL: 159AW210D35U SERIAL NO.: 1400

RANGE: 0 - 100 INCHES H₂O

SUPPLY: 7.50 VDC OUTPUT: 0-5 VDC CONDITION: NEW ADJUSTMENTS: NONE

INPUT PRESSURE				22222	.=====				22222	400#
(INCHES H ₂ C)) U" 	10"	20"	30"	40"	50" 	60"	70"	80"	100"
TEST					RANSDUC	ER OUT	PUT			
TEMPERATURE	Ξ				(INCHE	ES H ₂ 0)				
========	====== 	======	======	======	======	:======	======	======	======	=====
		10.40								
40 C	.26	10.46	20.62	30.74	40.80	50.92	60.96	70.96	80.98	100.38
30 C	.26	10.50	20.60	30.74	40.78	50.88	60.90	70.92	80.92	100.22
20 C	.20	10.36	20.50	30.60	40.66	50.72	60.78	70.74	80.72	100.06
10 C	.14	10.28	20.40	30.48	40.56	50.62	60.68	70.64	80.64	99.96
0 C	.10	10.26	20.36	30.46	40.52	50.58	60.56	70.56	80.54	99.84
- 5 ℃	.08	10.22	20.24	30.30	40.30	50.30	60.26	70.22	80.12	99.36
-10 C	.00	10.16	20.24	30.36	40.38	50.44	60.48	70.48	80.40	99.70
- 15 ℃	02	10.14	20.22	30.32	40.38	50.38	60.38	70.40	80.34	99.64
										-

- 1. THE TRANSDUCER WAS PLACED IN A FREAS MODEL 815 INCUBATOR AND THE TEMPERATURE WAS ALLOWED TO STABILIZE FOR 30 MINUTES BEFORE READING TRANSDUCER OUTPUT.
- 2. DRUCK MODEL DP1600 DIGITAL PRESSURE INDICATOR WAS USED AS THE PRESSURE REFERENCE AND WAS OPERATED AT ROOM TEMPERATURE UTILIZING AIR AS THE PRESSURE MEDIUM.
- 3. FLUKE MODEL 8050A 4-1/2 DIGIT MULTIMETER WAS USED FOR TRANSDUCER OUTPUT VOLTAGE MEASUREMENT.
- 4. THE 7.50 VOLT SUPPLY VOLTAGE WAS APPLIED TO THE TRANSDUCER DURING MEASUREMENT ONLY AND WAS DISCONNECTED DURING TEMPERATURE STABILIZATION.
- 5. THE 7.50 VOLT SUPPLY WAS CHECKED BEFORE EVERY MEASUREMENT AND WAS MAINTAINED AT 7.50 VOLT +/- .005 VOLT.
- 6. THE PRESSURE WAS INCREASED TO THE TEST VALUES WITHOUT OVERSHOOT TO MINIMIZE THE EFFECTS OF HYSTERISIS.

Table 12. Test of pressure transducer output as a function of temperature for Robinson-Halpern transducer, serial no. 1401.

MODEL: 159AW210D35U SERIAL NO.: 1401

RANGE: 0 - 100 INCHES H₂0

SUPPLY: 7.50 VDC OUTPUT: 0-5 VDC CONDITION: NEW ADJUSTMENTS: NONE

0"					50 "	60"	70"	80"	100"
	======	======	T	RANSDUC (INCHE	ES H ₂ 0)	=======	:======	:::::::::	
.16¦	10.16	20.14	30.14	40.14	50.14	60.14			
.12¦	10.16	20.12	30.12	40.12	50.16	60.12	70.12	80.12	100.10
.22	10.16	20.16	30.14	40.14	50.12	60.12	70.081	80.12	100.06
.24	10.24	20.18	30.18	40.14	50.16	60.16	70.12	80.10	100.02
.301	10.24	20.18	30.18	40.14	50.10	60.12	70.10	80.04	99.96
.28	10.26	20.22	30.14	40.14	50.12	60.08	70.04	80.02	99.92
.32¦	10.30	20.24	30.20	40.12	50.12	60.14	70.08	80.04	99.90
.32¦	10.28	20.26	30.22	40.16	50.16	60.12	70.08	80.08	99.96
.381	10.34	20.28	30.26	40.24	50.16	60.16	70.12	80.10	99.96
	.30	.16 10.16 .12 10.16 .22 10.16 .24 10.24 .30 10.24 .30 10.24 .32 10.30 .32 10.30	.16 10.16 20.14 .12 10.16 20.12 .22 10.16 20.16 .24 10.24 20.18 .30 10.24 20.18 .38 10.36 20.24 .32 10.30 20.24 .32 10.38 20.26	.16 10.16 20.14 30.14 .12 10.16 20.12 30.12 .22 10.16 20.16 30.14 .24 10.24 20.18 30.18 .30 10.24 20.18 30.18 .28 10.26 20.22 30.14 .32 10.30 20.24 30.20 .32 10.28 20.26 30.22 .38 10.34 20.28 30.26	TRANSDUC (INCHE .16 10.16 20.14 30.14 40.14 .12 10.16 20.12 30.12 40.12 .22 10.16 20.16 30.14 40.14 .24 10.24 20.18 30.18 40.14 .30 10.24 20.18 30.18 40.14 .28 10.26 20.22 30.14 40.14 .32 10.30 20.24 30.20 40.12 .32 10.28 20.26 30.22 40.16 .38 10.34 20.28 30.26 40.24	TRANSDUCER OUTF (INCHES H ₂ O) .16 10.16 20.14 30.14 40.14 50.14 .12 10.16 20.12 30.12 40.12 50.16 .22 10.16 20.16 30.14 40.14 50.12 .24 10.24 20.18 30.18 40.14 50.16 .30 10.24 20.18 30.18 40.14 50.10 .28 10.26 20.22 30.14 40.14 50.12 .32 10.30 20.24 30.20 40.12 50.12 .32 10.28 20.26 30.22 40.16 50.16 .38 10.34 20.28 30.26 40.24 50.16	TRANSDUCER OUTPUT (INCHES H ₂ O) .16 10.16 20.14 30.14 40.14 50.14 60.14 .12 10.16 20.12 30.12 40.12 50.16 60.12 .22 10.16 20.16 30.14 40.14 50.12 60.12 .24 10.24 20.18 30.18 40.14 50.16 60.16 .30 10.24 20.18 30.18 40.14 50.10 60.12 .28 10.26 20.22 30.14 40.14 50.10 60.12 .28 10.30 20.24 30.20 40.12 50.12 60.08 .32 10.30 20.24 30.20 40.12 50.16 60.14 .32 10.34 20.28 30.26 40.24 50.16 60.16	TRANSDUCER OUTPUT (INCHES H ₂ O) .16 10.16 20.14 30.14 40.14 50.14 60.14 70.14 .12 10.16 20.12 30.12 40.12 50.16 60.12 70.12 .22 10.16 20.16 30.14 40.14 50.12 60.12 70.08 .24 10.24 20.18 30.18 40.14 50.16 60.16 70.12 .30 10.24 20.18 30.18 40.14 50.10 60.12 70.10 .28 10.26 20.22 30.14 40.14 50.12 60.08 70.04 .32 10.30 20.24 30.20 40.12 50.12 60.14 70.08 .32 10.28 20.26 30.22 40.16 50.16 60.12 70.08	TRANSDUCER OUTPUT (INCHES H ₂ O)

- 1. THE TRANSDUCER WAS PLACED IN A FREAS MODEL 815 INCUBATOR AND THE TEMPERATURE WAS ALLOWED TO STABILIZE FOR 30 MINUTES BEFORE READING TRANSDUCER OUTPUT.
- 2. DRUCK MODEL DP1600 DIGITAL PRESSURE INDICATOR WAS USED AS THE PRESSURE REFERENCE AND WAS OPERATED AT ROOM TEMPERATURE UTILIZING AIR AS THE PRESSURE MEDIUM.
- 3. FLUKE MODEL 8050A 4-1/2 DIGIT MULTIMETER WAS USED FOR TRANSDUCER OUTPUT VOLTAGE MEASUREMENT.
- 4. THE 7.50 VOLT SUPPLY VOLTAGE WAS APPLIED TO THE TRANSDUCER DURING MEASUREMENT ONLY AND WAS DISCONNECTED DURING TEMPERATURE STABILIZATION.
- 5. THE 7.50 VOLT SUPPLY WAS CHECKED BEFORE EVERY MEASUREMENT AND WAS MAINTAINED AT 7.50 VOLT +/- .005 VOLT.
- 6. THE PRESSURE WAS INCREASED TO THE TEST VALUES WITHOUT OVERSHOOT TO MINIMIZE THE EFFECTS OF HYSTERISIS.

Table 13. Test of pressure transducer output as a function of temperature for Robinson-Halpern transducer, serial no. 1406.

MODEL: 159AW210D35U SERIAL NO.: 1406

RANGE: 0 - 100 INCHES H20

SUPPLY: 7.50 VDC OUTPUT: 0-5 VDC CONDITION: NEW ADJUSTMENTS: NONE

========												
INPUT												
PRESSURE	2) 0"	100	2011	2011	11.0.11	<i></i>	60"	70"	00"	10011		
(INCHES H ₂ C)) U''		20"	30"	40"	50"	00"	70"	80"	100"		
TEST				Т	'RANSDUC	ER OUT	PUT					
TEMPERATURE	Ε				(INCHE	ES H ₂ 0)						
========	=====	:=====	======	======	======	:=====	======	======	:=====:	======		
50 C	.52	10.76	20.961	31.16	41.26	51.38	61.50	71.52	81.56	100.86		
		10.74										
		10.62										
		10.46										
		10.28										
	•		•	•			•			•		
· ·	•	10.14										
- 5 ℃	16	10.18	20.40	30.62	40.74	50.84	60.94	71.00	81.00	100.40		
		 10.12										
	•	10.12 										
- 15 C	20	10.08	20.32	30.561	40.66	50.78	60.88	70.96	80.96	100.30		
				¦								

- 1. THE TRANSDUCER WAS PLACED IN A FREAS MODEL 815 INCUBATOR AND THE TEMPERATURE WAS ALLOWED TO STABILIZE FOR 30 MINUTES BEFORE READING TRANSDUCER OUTPUT.
- 2. DRUCK MODEL DP1600 DIGITAL PRESSURE INDICATOR WAS USED AS THE PRESSURE REFERENCE AND WAS OPERATED AT ROOM TEMPERATURE UTILIZING AIR AS THE PRESSURE MEDIUM.
- 3. FLUKE MODEL 8050A 4-1/2 DIGIT MULTIMETER WAS USED FOR TRANSDUCER OUTPUT VOLTAGE MEASUREMENT.
- 4. THE 7.50 VOLT SUPPLY VOLTAGE WAS APPLIED TO THE TRANSDUCER DURING MEASUREMENT ONLY AND WAS DISCONNECTED DURING TEMPERATURE STABILIZATION.
- 5. THE 7.50 VOLT SUPPLY WAS CHECKED BEFORE EVERY MEASUREMENT AND WAS MAINTAINED AT 7.50 VOLT +/- .005 VOLT.
- 6. THE PRESSURE WAS INCREASED TO THE TEST VALUES WITHOUT OVERSHOOT TO MINIMIZE THE EFFECTS OF HYSTERISIS.

(intercept at a temperature of 0 °C) and the change of pressure as a function of temperature (slope of regression line) are presented in Table 5 for the four sites and eight transducers studied. the laboratory tests were obtained by interpolating between pressure settings used, according to the depth of fluid in the gage at the field sites. While these comparisons are not precise, they are sufficiently accurate to indicate the magnitude of errors that might be encountered in correcting field data using these methods. Of greater concern is the effect of the different temperatures involved. The field results are based on air temperature obtained from sensors located outside the instrument shelters, while laboratory results are based on actual transducer temperatures. As seen in Figures 2-16, air temperature and the temperature of the transducer in the instrument shelter are quite different at certain times. Thus the transducers at the field sites may be subjected to considerably greater temperature changes than those indicated by the air temperature readings.

The amount of pressure change expected for a 30 °C change in air temperature at the SNOTEL sites and a 40 °C change in transducer temperature in the laboratory are shown in Table 14 for each of the four Idaho SNOTEL sites. Changes due to expansion of the system and fluid characteristics are also included.

The results in Table 14 indicate that corrections to SNOTEL data, based on relationships developed from laboratory tests of the transducers and the simulated site for the system and fluid would improve accuracy in almost all cases. However, errors for both test periods at Moores Creek and for the June test period at Banner Summit would still be more than desirable. The Moores Creek results seem to indicate a consistent difference that could be caused by local conditions or system problems. At Banner Summit it appears that transducer #290 responded differently in the field than in the laboratory. Part of this difference could also be due to a different relationship between air temperature and transducer temperature than that assumed in the calculations.

The laboratory procedure for establishing a relationship between pressure and temperature changes of a transducer uses air as the fluid. A modification of this procedure can be made to use water, methyl alcohol-ethylene glycol, or other fluids. When this is done, the transducer is filled with the liquid desired and transducer and fluids are placed in a temperature controlled chamber. Air pressure is still used to provide a range of pressures, but it is applied to the column of fluid in the transducer. As a check on the use of air as the fluid, tests were also conducted using water and methyl alcohol-ethylene glycol in the same transducer (#1390) and subjected to the same temperature and pressure changes. The transducer outputs as a function of pressure and temperature are presented in Table 15. As noted, the outputs are not the same for all three fluids. However, differences are less than 3 percent in all cases, and as long as the same fluid was used in all tests, results should be within allowable limits.

Plots of temperature versus transducer output for a 60 inch pressure head are presented in Figure 22. Similar plots for the other pressure heads tested showed the same trends, indicating a consistency between

Table 14. Comparison of observed diurnal pressure fluctuations from SNOTEL sites in Idaho with estimated fluctuations based on temperature corrections to transducers, precipitation systems, and fluid characteristics (inches).

	Stickne	∍y Mill	Vienn	a Mine	Banner	- Summit	Moores	s Creek
	JUN	OCT	JUN	OCT	JUN	OCT	JUN	OCT
Estimated Change								
Transducer	88	28	1.28	.39	.48	.44	.28	12
System	05	05	07	06	03	04	06	02
Fluid	12	10	04	12	20	15	10	23
Total	-1.05	.13	1.17	.21	•25	•25	.12	37
Observed Change								
SNOTEL total	-1.08	.42	1.26	.06	1.29	.48	.96	•50
Difference between								
observed & estimated	03	•29	•09	15	1.04	•23	.84	.87

Pressure transducer output as a function of pressure head and temperature for Robinson-Haipern transducer #1390 using three different fluid mediums. Table 15.

						Press	ure Hea	d (inch	Pressure Head (inches of water)	iter)					
		20			40			09			80			100	
emperature °C	Air	Air G.M. Water	Water	Alr	Alr G.M.	Water	Alr	e N. O	Alr G.M. Water	Air	∑	Air G.M. Water	Air	Air G.M.	Water
50°	20,49	20,13	20,13 19,89	40,89	40.08	39,99	61,17	59,94	59,85	81,33	79,89	79,56	101,49	101,49 99,63 99,63	99,63
40°	20,52	20.10	20.28	40.92	40,17 4	40,26	61,20	90.09	60,24	81,45	79,98	80,13	101,55	99,75	99,90
30°	20,46	20,16	20,13	40,86	40,20	40.23	61,20	60,21	60,21	81,42	80.04	80,13	101,55	101,55 99,96	96°66
20°	20,46	20,25	20,13	40.89	40,32	40,26	61,20	60,36	60,24	81,42	80,31	80,16	101,55		66.66
10°	20,49	20,25	20,16	40,89	40.41	40,26	61,20		60,24	81,39	80,46	80,19	101,49	101,49 100,38	100,02
° 0	20,49	20,34		40,89	40.53		61,20	60,63		81,42	80,64		101,52	01.52 100.56	
-5°	20,43	20,37		40,86	40,56		61,14	60,63		81,36	80,70		101,49	101,49 100,62	
-10°	20,46	20,34		40,89	40,59		61,23	60,72		81,45	80,76		101,55 100,71	100,71	
-15°	20,46	20,37		40.89	40,56		61,20	60,72		81,39	80,82		101,49	01,49 100,77	

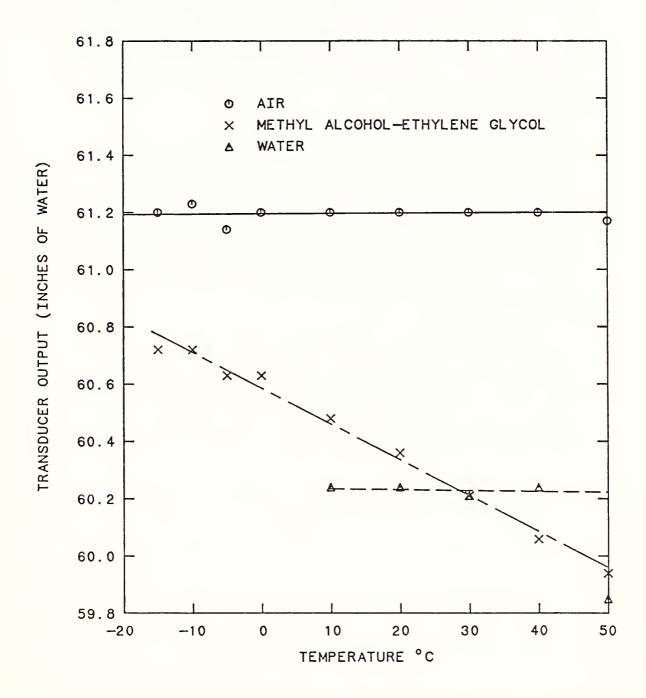


Figure 22. Laboratory tests of transducer output (inches of water) as a function of temperature (°C) for Robinson-Halpern transducer #1390 using air, water, and methyl alcohol-ethylene glycol as the fluids in the transducer under an imposed pressure of 60 inches of water.

the fluids and the transducer. For transducer #1390 used in this test, the output remains essentially constant as temperature changes when air and water are used. When methyl alcohol-ethylene glycol is used the transducer output decreases with increasing temperature. This supports the results presented in Table 2, which show that the difference between calculated and observed pressure changes decrease as the percent methyl alcohol-ethylene glycol in the mixture decreases. The magnitude of this fluid characteristic factor was determined from values presented in Table 2 and results are displayed in Figure 23, where the change in pressure transducer output is shown as a function of percent methyl alcohol-ethylene glycol.

Recommendations

More comparisons of transducer response under field and laboratory conditions need to be conducted in order to establish correction procedures. Since 20 new transducers have been laboratory tested, if the sites and transducer serial numbers could be identified, the October 1987 SNOTEL data already collected could readily be analyzed. Also, some of the old transducers that were removed have been laboratory tested, and this data plus the June 1987 SNOTEL data could be compared. The addition of 8 to 12 new comparisons could aid considerably in establishing consistency of relationships and possible correction procedures.

C. Statistical Analysis of SNOTEL Flutter Study Data

The 1985 flutter study data were scanned and a rerun was made on the stations where a rain free period of more than five observations could be obtained. Tables for each state have been prepared that are similar to the ones in the 1986 SNOTEL Annual Progress Report. However, the 1985 data proved to be so limited that no valid comparisons could be made between the 1985 and 1986 results. Properties of the 1985 data that severely limited their usefulness were:

- 1. Only two observations per day which does not adequately represent the diurnal temperature pattern necessary to characterize a precipitation temperature dependency.
- 2. Equipment changes that may have occurred between the 1985 and 1986 flutter study runs.
- 3. The widespread occurrence of precipitation during the 1985 run which greatly reduced the number of rain-free observations.

For these reasons, the statistical characterization of the temperature dependency of the SNOTEL precipitation measurements is confined to the 1986 flutter runs as reported in the 1986 annual progress report.

Frequency statistics from the 1986 flutter run were tabulated and are included as Tables 16 through 25. The specification error band was recalculated and the statistics concerned with specification conformance are based on the recalculated error band. The revised tables are also included in this progress report, one for each state (Tables 26-34).

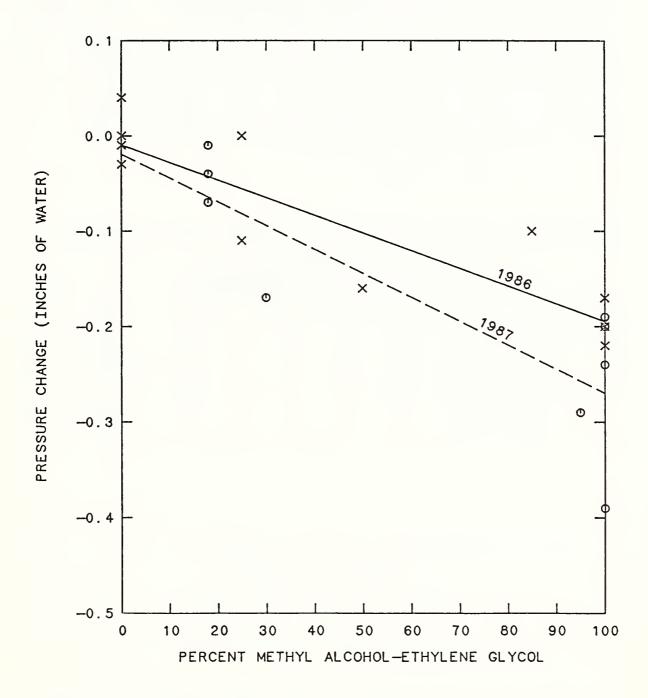


Figure 23. Pressure change in inches of water as a function of percent methyl alcohol-ethylene glycol in mixture, during two summers at the simulated SNOTEL site near the Boise Federal Building. The pressure change shown is the difference between observed and calculated pressure change for the simulated system.

Table 16. Frequency statistics from the 1986 flutter study for Arizona.

		Specificatio lde Band		Band de Band	J	[otal
	No•	Percent	No.	Percent	No.	Percent
Total	10	59	7	41	17	100
+ correlation	4	40	1	14	5	29
- correlation	6	60	6	86	12	71
Random Prob < 0.02	6	67	3	33	9	53
+ correlation	3	50	0	0	3	33
- correlation	3	50	3	100	6	67

Table 17. Frequency statistics from the 1986 flutter study for Colorado.

		Specification ide Band		Band de Band	,	T otal
	No•	Percent	No.	Percent	No.	Percent
Total + correlation - correlation	52	71	21	29	73	100
	37	71	14	67	51	70
	15	29	7	33	22	30
Random Prob < 0.02	33	77	10	23	43	60
+ correlation	29	88	8	80	37	86
- correlation	4	12	2	20	6	14

Table 18. Frequency statistics from the 1986 flutter study for Idaho.

		Specification		Band de Band	7	C otal
	No.	Percent	No.	Percent	No.	Percent
Total	42	67	21	33	63	100
+ correlation	18	43	9	43	27	43
- correlation	24	57	12	57	36	57
Random Prob < 0.02	27	63	 16	37	43	68
+ correlation	13	48	6	37	19	44
- correlation	14	52	10	63	24 	56

Table 19. Frequency statistics from the 1986 flutter study for Montana.

		Specification		Band ide Band	•	Total
	No•	Percent	No.	Percent	No.	Percent
Total	64	96	3	4	67	100
+ correlation	17	27	1	33	18	27
- correlation	47	73	2	67	49	73
Random Prob < 0.02	25	89	3	11	28	42
+ correlation	3	12	1	33	4	14
- correlation	22	88 	2 	67 	24	86

Table 20. Frequency statistics from the 1986 flutter study for Nevada.

		Specification	Outsi	de Band		[otal
	No.	Percent	No.	Percent	No.	Percent
Total + correlation - correlation	40	82	9	18	49	100
	18	45	4	44	22	45
	22	55	5	56	27	55
Random Prob < 0.02 + correlation - correlation	26	76	8	24	34	69
	10	38	4	50	14	41
	16	62	4	50	20	59

Table 21. Frequency statistics from the 1986 flutter study for Oregon.

		Specification		Band de Band	5	Total .
	No•	Percent	No •	Percent	No.	Percent
Total + correlation - correlation	40	58	29	42	69	100
	16	40	17	59	33	48
	24	60	12	41	36	52
Random Prob < 0.02 + correlation - correlation	23	46	27	54	50	72
	8	35	16	59	24	48
	15	65	11	41	26	52

Table 22. Frequency statistics from the 1986 flutter study for Utah.

		Specification		Band de Band	•	[otal
	No.	Percent	No.	Percent	No•	Percent
Total	47	66	- 24	34	71	100
+ correlation	15	32	15	63	30	42
- correlation	32	68	9	37	41	58
Random Prob < 0.02	16	48	 17	52	33	-
+ correlation	4	25	13	76	17	52
- correlation	12	75	4	24	16	48

Table 23. Frequency statistics from the 1986 flutter study for Washington.

		Specification Ide Band Percent		Band de Band Percent	No.	Cotal Percent
	NO •	rercent	NO •		NO•	rercent
Total	25	69	11	31	36	100
+ correlation	10	40	8	73	18	50
- correlation	15	60	3	27	18	50
Random Prob < 0.02	15	60	10	40	25	69
+ correlation	5	33	8	80	13	52
- correlation	10	67	2	20	12	48

Table 24. Frequency statistics from the 1986 flutter study for Wyoming.

		Specificatio lde Band		Band de Band	5	Total
	No.	Percent	No.	Percent	No.	Percent
Total	49	68	23	32	72	100
+ correlation- correlation	21 28	43 57	11 12	48 52	32 40	44 56
Random Prob < 0.02	21	57	16	43	37	51
+ correlation- correlation	9 12	43 57	10 6	63 38	19 18	51 49

Table 25. Frequency statistics from the 1986 flutter study for all sites.

		Specification Ide Band		Band de Band		Total
	No.	Percent	No.	Percent	No.	Percent
Total + correlation - correlation	369	71	148	29	517	100
	156	42	80	54	236	46
	213	58	68	46	281	54
Random Prob < 0.02	192	64	110	36	302	58
+ correlation	84	44	66	60	150	50
- correlation	108	56	44	40	152	50

TABLE 26. REVISEO PRECIPITATION-TEMPERATURE 1986 FLUTTER STUDY STATISTICS FOR SNOTEL SITES IN ARIZONA.

												TEMPER	RATURE			
					P/T		RANGE OF READINGS			CORRECT 10N						
	TTE SENSOR SNOTEL		AUGUST 1986		CORRE- LATION		FOR ZERO PRECIP (INCHES)			TEMPERATURE RANGE (OEGREES C)			(c = a + bT)		SPECIFICATION ERROR BANO	
SITE																
_	TYPE	STATION NAME	OATE		(R)	(PCT)	AVE		OELTA	AVE		0ELTA	a	ь	LOW	HIGH
		ER BUTTE	18-23		0.709	0.01		25.40					-0.261	0.012		
11	RH10 BALDY		18-26	34	-0.014	93.55	23,36	23.10	0.70	11.49	3.30	19.00	0.001	0.000	23.07,	23.65*
69	69 RH10 BUCK SPRING		18-23	22	-0.709	0.02	24.70	24.50	0.30	16.97	2.40	25.70	0.152	-0.009	24.39,	25.01
111	II RHIO CORONAGO TRAIL		18-27	36	-0.404	1.45	28.72	23,60	6.20	14.56	6.10	20.30	1.454	-0.100	28.39,	29.05*
177	RH10 FR1	SCO OTVIOE	18-24	22	0.141	53.13	19.81	19.50	0.50	16.53	8.00	19.40	-0.051	0.003	19.60,	20.02
179	RHO5 FRY		18-22	22	-0.873	<.01	25.75	25.60	0.30	19.30	9.20	22.20	0.200	-0.010	25.48,	26.02
202	PR10 HAN	NAGAN MEADOWS	18-28	41	-0.319	4.22	24.00	23.30	1.60	12.41	4.70	20.50	0.398	-0.032	23.71,	24.29
208	RHO5 HEBER		18-25	25	0.311	13.02	24,69	24.60	0.20	20.10	13,10	19.90	-0.066	0.003	24.47,	24.91
281	RH10 LOOKOUT MOUNTAIN		18-22	22	-0.919	<.01	22.05	21.90	0.30	20.38	12,60	18.00	0.338	-0.016	21.85,	22.25
298	PRIO MAY	ERICK FORK	18-25	31	-0.267	14.65	18.38	18.20	0.40	12,19	3.20	19,20	0.051	-0.004	18,15,	18.61
316	RH05 MORI	MON MOUNTAIN	18-28	37	-0.250	13.58	27.59	26.80	2.90	16,15	9.30	17.20	0.504	-0.031	27.31,	27.87*
422	RH10 S1G	NAL PEAK	18-22	15	0.617	1.42	35.29	35,10	0.40	17.76	11.70	14.50	-0.264	0.015	34.96,	35,62
424	RH10 SIL	VER CREEK OIVIOE	18-25	29	0.580	0.09	31.46	31.30	0.30	13.18	5.20	17.10	-0.136	0.010	31.09,	31.83
459	RH10 SUG	AR LOAF	18-23	25	-0.932	<.01	17.94	17.50	0.90	23.12	12.10	19.50	0.987	-0.043	17,77,	18,114
512	RH05 WH1	TE HORSE LAKE	18-22	14	-0.597	2.41	21.18	21.10	0.20	19,51	10.90	20.30	0.122	-0.006	20.97,	21.39
517	RHO5 WIL	DCAT	18-23	22	-0.296	18.11	28.40	28.30	0.20	15.87	4.70	21.90	0.044	-0.003	28.06,	28.74
527	RH10 WOR	KMAN CREEK	18-22	15	-0.814	0.02	-	32,30	0.50	-		16,90	-		32.23.	-

^{*} INDICATES THAT ONE OR MORE MEASURED PRECIPITATION DATA VALUES FELL DUTSIDE THE SPECIFICATION ERROR BAND.

TABLE 27. REVISEO PRECIPITATION-TEMPERATURE 1986 FLUTTER STUDY STATISTICS FOR SNOTEL SITES IN COLORADO.

		P/T			RANGE OF READINGS							TEMPERATURE CORRECTION			
		AUGUST		CORRE -	RANOOM	FOR ZERO PRECIP			TEMPERATURE RANGE			EQUATION		SPECIFICATION	
SITE	SENSOR SNOTEL	1986		LATION	PR0B		(INCHES	()	(D	ECREES	C)	(c = a	a + bT)	ERROR	BAN0
_	TYPE STATION NAME	OATE			(PCT)	A VE		OELTA	AVE		OELTA	а	ь	LOW	HIGH
	RHO5 APISHAPA	18-21		0,727	0.48		24.90	0.20	15.59			-0.144		24.72,	
5	PR10 ARROW	18-28		-0.222	14.67	25.52	25.50	0.10	13.34		17.10	0.036	-0.002		
16	RHOS BATEMAN	18-24	27	-0.822	<.01		25.20	0.60	13.59		17.50	0.269		25.25,	
22	RH10 BEAR LAKE	18-28	18	0.006	98,10	42.89	42.10	1.40	11,67	5.10	13.40	-0.003	0.001	42.39,	43.39*
27	RH10 8EARTOWN	24-28	19	0.828	<.01	46.49	46.30	0.40	7.82	0.80	14.70	-0.153	0.020	45.87,	47.11
36	RH10 BERTHOUO SUMMIT	22-25	13	-0.756	0.28	41.82	41.70	0.20	7,17	2.30	11.60	0.097	-0.013	41,29,	42.35
46	RH10 BISON LAKE	25-28	17	0.939	<.01	54.11	53.90	0.50	9,15	3.50	11.70	-0.411	0.045	53.44,	54.78
67	RH10 BRUMLEY	24-28	14	0.650	1.18	25.86	25.80	0.20	9.35	1.10	15.00	-0.084	0.009	25,52,	26,20
75	PRIO BURRO MOUNTAIN	18-28	44	0.973	<.01	56.59	11.70	84.50	31.45	2.90	47.10	-63.660	2.024	55.78,	57.40*
77	RH10 BUTTE	18-23	25	0.828	<.01	30,21	30.00	0.50	12,63	5.10	16.10	-0.303	0.024	29.85,	30.57
82	RH10 CASCAOE	18-21	14	0.625	1.67	40.85	40.70	0.20	15.55	7.90	18.10	-0.092	0.006	40.41,	41.29
87	RHO5 CATHEDRAL BLUFFS	18-21	13	-0.104	73.61	29.52	29,40	0.20	19.94	10.80	15.40	0.018	-0.001	29.23,	29.81
91	RH05 CHAMITA	19-23	13	0.826	0.05	27.75	27.70	0.10	16.19	6.60	19.70	-0.090	0.006	27.44,	28.06
104	RH10 COLUMBINE	24-28	18	0.862	<.01	42.63	42.10	1.30	14.23	6.00	19.10	-0.807	0.057	42.14,	43.12*
107	RH05 COPELANO LAKE	18-20	11	0.907	0.01	28.92	28.90	0.10	16.82	9.00	22.80	-0.080	0.005	28.62,	29.22
110	RHO5 COPPER MOUNTAIN	23-28	19	0.584	0.86	28.57	28.50	0.20	8.07	1,20	16.30	-0.061	0.007	28.19,	28.95
123	PR10 CULEBRA #2	18-23	20	-0.612	0.41	28.30	28.00	0.50	10.07	2.40	16.20	0.147	-0.015	27.94,	28,66
124	RH10 CUMBRES TRESTLE	18 - 23	22	0.843	<.01	40.42	40.20	0.40	14.49	5.70	18,50	-0.229	0.016	39.95,	40.89
131	PR10 OEADMAN HILL	25-28	12	0.578	4.88	35.32	35.30	0.10	6.73	-1.20	13.80	-0.036		34.82,	
148	RH10 DRY LAKE	21-28	33	-0,258	14,65	42.45	42.10	0.50	15,32	4.90	19.80	0.068	-0.004	41.95,	42.95
156	RH10 EL OIENTE PEAK	18-28	50	0.646	<.01	0.21	-0.10	1.20	10.73	2.80	18.50	-0.389	0.036	0.21,	0.21*
158	RH10 ELK RIVER	20-28	36	0.824	<.01	36.66	36.40	0.70	14.50	4.70	19.50	-0.329	0.023	36,22,	37,10*
176	RH10 FREMONT PASS	18-21	14	0.620	1.80	24.40	24.20	0.40	8.39	2.10	14.30	-0.148	0.018	24.09,	24.71
182	RH10 GALLEGOS PEAK	18-23	24	-0.861	<.01	29.79	29.40	0.70	12.64	5.00	18.80	0.420	-0.033	29.44,	30.14*
195	RH10 GRIZZLY PEAK	18-21	9	0.619	7.54	34.40	34.20	0.30	11.37	5.50	14.70	-0.150	0.013	34.00,	34.80
199	RH10 HAGERMAN TUNNEL	18-20	13	0.868	0.01	25.71	25.50	0.40	11,58	5,30	14.80	-0.244	0.021	25,41,	26.01
219	RH10 HOOSIER PASS	18-20		0.624	4.03		26.40	0.10	12.08			-0.089		26.15,	
	RH10 HOPEWELL	18-23		-0.160	46.46		32,50	0.20	9,60	3,00	16,20	0.024		32,20,	
	RH10 IOARADO	18-28		-0.006	97.89		31.60	1.80	15.29	-	12.80	0.018		32.37,	
230	RH10 INOEPENOENCE PASS	25-28	14	0.872	<.01	32.37	32,20	0.30	8,47	0.30	14.40	-0,138	0.016	31.93,	32.81
239	RH10 JOE WRIGHT	25 - 28		0.135	69.17		49.10	0.20				-0.005		48.44,	
	RHOS KILN			-0.657	0.41		24.30	0.10	15.17			0.059		24.02,	
	RH05 LAKE ELOORA	18-20	9	0.732	2.49		27.30	0.50				-0.360		27.20,	
	PRIO LAKE TRENE			-0.301	4.72		40.00	0.50	9.32			0.122	-0.013		-
268	RH10 LILY PON0	18-21	13	0.816	0.06	36.34	36.10	0.40	13.86	5, 10	16,50	-0,300	0.022	35.91,	36.77
	RHO5 LIZARO HEAO PASS	25-28		0.912	<.01		34.60	0.30	8,39			-0.145	-	34.29,	-
	RH10 LONE CONE			-0.374								0.034			
	PRIO LYNX PASS			-0.236	48.50		27.50	0.50	10.13		18.70	0.049		27,32,	
	RHIO MC CLURE PASS RHIO MIOOLE CREEK	18 - 21 18 - 23		0.863 0.638	<.01		35.90 41.50	0.60 0.30	18.13 11.55			-0.519 -0.096		35.81, 41.13,	
دەر	KITTO MITOULE CREEK	10-23	20	0.000	0.02	رن•۱۰	71.00	0.50	11,00	J. 20	10,10	-0.090	0.009	, د ۱ _۱ ۰	72.17
	RH10 MINERAL CREEK	22-28		0.806	<.01		31.60	0.30	11.15			-0.164 0.112	0.015 -0.010	31.34,	32.14 1.53*
	RH10 MOLAS LAKE RH10 NAST LAKE	18-28		-0.081 0.897	60.86		0.60 22.60	2.00 0.90	10.59 15.02		19.70	-0.403		22.76.	
	RHOS NAVAL OILSHALE	18-23		0.598	<.01 5.18		27.80	0.20				-0.244	-	27.66.	-
	RHOS NIWOT	18-21		0.400	22.25		32.30	0.50	12.04			-0.103		32.09,	
340	RHIO NORTH COSTILLA	18-23	16	0.407	11.74	22 50	22.40	0.20	6.99	0.80	14 10	-0.041	0.006	22,20,	22.80
	RHIO NORTH LOST TRAIL	18-23		0.407	0.55		38.90	0.70	15.70			-0.302		38.74,	
	RHO5 PANCHUELA	18-21		0.833	0.04		23.70	0.70	14.73			-0.070		23.51,	
	RH10 PARK CONE	25-28		0.960	<.01		21.10	0.50	12.44			-0.264		21.08,	
	RH10 PARK RESERVOIR	18-24		0.213	30.64		50.00	0.80	9.30	-		-0.062		49.86,	
					-	-	-	-							

^{*} INDICATES THAT ONE OR MORE MEASURED PRECIPITATION DATA VALUES FELL OUTSIDE THE SPECIFICATION ERROR BAND.

TABLE 27. REVISEO PRECIPITATION-TEMPERATURE 1986 FLUTTER STUDY STATISTICS FOR SNOTEL SITES IN COLORADO (CONTINUEO).

							+							
											TEMPE	RATURE		
			P/T		RANG	E OF RE	A01NGS				CORR	ECTION		
		AUGUST	CORRE-	RANDOM	FOR	ZERO P	RECIP	TEMPE	RATURE	RANGE	E Q U/	AT!ON	SPECIF	ICATION
SITE	SENSOR SNOTEL	1986	LATION	PROB		(INCHES)	(0	EGREES	C)	(c =	a + bT)	ERROR	BAND
NO	TYPE STATION NAME	OATE NOB	S (R)	(PCT)	AVE	MIN	0ELTA	AVE	MIN	OELTA	a	b	LOW	HIGH
360	RHO5 PHANTOM VALLEY	18-20 12	0.911	<.01	29.88	29.70	0.40	16,35	4.60	22.60	-0.249	0.015	29.52,	30.24
373	PR 10 PORPHYRY CREEK	18-28 45	-0.236	11.91	26.04	25,20	1,60	9.97	2.00	18,20	0.217	-0.022	25.70,	26.38*
380	RH05 QUEMAZON	18-26 11	0.005	98.93	28.82	27,60	2,10	16.05	9.70	15.50	-0.009	0.000	28,53,	29.11*
384	RH10 REO MOUNTAIN PASS	25-28 12	0.895	<.01	43.03	42.70	0.60	8.01	3.30	12.10	-0.354	0.045	42.50,	43.56
386	RH10 REO RIVER PASS #2	24-28 14	-0.352	21.77	19,67	19,60	0.30	8.99	1.10	15.10	0.071	-0.008	19.41,	19.93
388	RH10 ROACH	22-27 22	0.800	<.01	40.60	40.50	0.30	11.55	0.00	18.80	-0.174	0.015	40.05,	41.15
407	RH10 SCHOFIELO PASS	25-28 15	0.935	<.01	59.97	59.80	0.40	7.95	2.80	13.30	-0.196	0.024	59.21,	60.73
409	RH10 SCOTCH CREEK	24-28 15	0,535	4.00	1.41	1.40	0.10	11,27	3,20	18,60	-0.035	0.003	1.39,	1.43*
413	RHO5 SENORITA OIVIOE	18-23 16	-0.410	11.42	29,11	29,00	0.20	14.53	5.30	18,90	0.036	-0.003	28,77,	29.45
430	RHO5 SLUMGULLION	18-20 12	0.790	0.22	25.78	25.70	0.30	13.22	6.50	14.70	-0.168	0.013	25,49,	26.07
454	RH10 STILLWATER CREEK	21-28 31	0.933	<.01	20,61	20.40	0.50	11.94	3.60	18,10	-0.323	0.027	20.36,	20.86*
462	PR10 SUMMIT RANCH	18-20 10	-0.258	47.14	23.77	23.70	0.10	15.15	5.40	20.60	0.025	-0.002	23.49,	24.05
478	RH10 TOWER	21-24 16	-0.944	<.01	66.36	66.30	0.10	11.04	5.70	10.00	0.135	-0.013	65.59,	67.13
480	RH10 TRAPPER LAKE	24-28 15	0.646	0.93	37.19	37.00	0.40	10.24	1.30	18.50	-0.119	0.012	36.70,	37.68
491	PRIO UNIVERSITY CAMP	18-19 8	0.903	0.21	37.95	37.90	0.10	15.24	7.40	14.50	-0.128	0.008	37,53,	38.37
492	PR10 UPPER SAN JUAN	21-23 10	-0.316	37.38	62.86	62.80	0.10	11,53	4.20	14.70	0.037	-0.003	62,10,	63.62
494	RH10 VAIL MOUNTAIN	18-21 15	0.777	0.06	32.04	31.90	0.60	14.35	6.40	17.00	-0.383	0.027	31.68,	32.40*
495	RH10 VALLECITO	26-28 7	0.127	78.58	18.31	16.00	4.20	8.93	5.40	8.60	-0.706	0.080	18.10,	18.52*
499	RH05 W FORK PARACHUTE	21-24 14	0.837	0.01	23.84	23.80	0.10	13.77	4.60	17.90	-0.091	0.007	23.56,	24.12
509	RH05 WHISKEY CK	18-28 26	-0.097	63.89	34.02	32,90	2.70	11,73	1.30	20.00	0.176	-0.015	33.57,	34.47*
520	PR 10 WILLOW CREEK PASS	21-27 11	-0.409	21,11	29,67	29.60	0.70	8.99	2.00	16.00	0.130	-0.014	29.29,	30.05*
521	RH10 WILLOW PARK	22-28 20	0.710	0.04	43.37	43.00	1.00	7.72	-0.60	16.80	-0.310	0.040	42.77,	43.97*
524	RH10 WOLF CREEK SUMMIT	22-23 6	0.808	5.19	14.37	14.20	0.30	11.08	6.00	9.40	-0.228	0.020	14.21,	14.53*

^{*} INDICATES THAT ONE OR MORE MEASURED PRECIPITATION DATA VALUES FELL DUTSIDE THE SPECIFICATION ERROR BAND.

TABLE 28. REVISEO PRECIPITATION-TEMPERATURE 1986 FLUTTER STUDY STATISTICS FOR SNOTEL SITES IN IDAHO.

NO	SENSOR SNOTEL TYPE STATION NAME	AUGUST 1986 OATE		LATION	RANDOM PROB (PCT)		E OF RE ZERO PI (INCHES MIN	RECIP		RATURE EGREES MIN		CORRI EQU/	RATURE ECTION ATION a + bT) b	SPECIF ERROR LOW	ICATION BANO HIGH
6	RH15 ATLANTA SUMMIT	23-28		-0.511	3.02		52.20	0.60	13.87	4.50	17.30	0.167	-0.012	51.93,	53,19
	RH10 BANNER SUMMIT	24-28		0.902	<.01		47.50	0.60	18.94	7.20	20.50	-0.423		47.29,	
	RH10 BEAR BASIN	22-28		-0.732	0.01	36.51		0.50	17.33	5.20		0.348		36.08,	
	RH10 BEAR CANYON RH20 BEAR MOUNTAIN			-0.792 -0.732	<.01 <.01		31.70 76.60	0.20 0.40	14.27 16.57	2.60 6.80	20,20 17,70	0.139 0.323		31.42, 75.97,	
24	RH10 BEAR SAOOLE	21-28	29	-0.348	6.41	34,77	34.60	0.30	19.03	8.70	19.90	0.102	-0.005	34.41,	35,13
34	RH15 BENNETT MOUNTAIN	23-28	20	-0.724	0.03	33,52	33.20	0.70	22.37	14,30	16.20	0.553		33.24	
39	RH10 BIG CREEK SUMMIT	23-28	10	-0.810	0.44	49.84	49.30	0.80	19,26	9.00	17.20	0.570	-0.030	49.32,	50.36
58	RH10 BOSTETTER R.S.	18-28	15	-0.232	40.58	29.95	29.50	0.90	12.03	8.00	10.80	0.279	-0.023	29.63,	30.27*
106	RH15 COOL CREEK	26-28	8	-0.635	9.04	61.87	61.80	0.20	20.88	16.40	8,60	0.304	-0.014	61.39,	62,35
	RHOS COZY COVE	23-28		0.626	0.23		36.00	0.10	19.39		28.00	-0.069		35.63,	
120	RH10 CRAB CREEK RH15 CRATER MEADOWS	23-28 26-28	9	-0.443 -0.975	5.04		27.90 59.50	0.20 0.50	19.24 19.17	13.20	13.60	0.140		27.76,	
	RH20 OEAOWOOO SUMMIT	22-28		-0.830	<.01 <.01		59.60	0.30	9.81	-2,20	25.60	0.490		59.03, 58.86.	
	RH10 OOLLARHIOE SUMMIT	23-28		-0.570	0.87		43.90	0.10	15.78	6.80	16.40	0.101 0.107		43.48,	-
157	RH15 ELK BUTTE	18-24	30	0.208	26.98	48.84	47.10	4.00	19.23	13.00	13.50	-1.172	0.061	48,40,	49.28*
162	RH10 EMIGRANT SUMMIT	24-28	17	0.905	<.01	55,89	55.50	1.20	16.28	9.00	17.20	-0.846	0.052	55.31,	56.47
180	RHO5 GALENA	23-28	18	0.917	<.01	31.52	31.40	0.30	16.68	0.80	29.50	-0.167	0.010	31,10,	31.94
181	RH10 GALENA SUMMIT	18-28	40	-0.774	<.01	32.25	31.10	2.30	14.48	3,10	20.60	1.334	-0.092	31.85,	32.65
183	RH05 GARFIELO R.S.	24-28	19	0.236	32,97	23,54	23.40	0.40	16.83	5,50	21.50	-0.045	0.003	23,27,	23.81
	RH05 GIVEOUT			-0.279	27,75	•	27.90	0.10	15.66	5,80		0.032	-	27.60,	-
	RHIO GRAHAM GUARO STA.		19	0.960	<.01		38.00	4.00	18.55			-2.337		39.30,	
	RH15 HEMLOCK BUTTE	18-20	9	0.122	75.40		60.40	0.30	19.97	14.80		-0.063		60.03,	
	RHIO HILTS CREEK RHIO HOWELL CANYON			-0.791 -0.842	0.01 0.01		23.40 49.90	0.40 0.40	16.06 16.56	8.70 7.90	13.70 18.50	0.303 0.337		23.33, 49.57,	
223	RH10 HUMBOLOT GULCH	18-21	10	0.072	84.40	47.78	47.70	0.10	16.02	8.10	19.50	-0,007	0.000	47,27,	48,29
225	RH10 HYNDMAN	23-28	18	0.707	0.10	28,69	28,60	0.20	16.36	5.50	20.10	-0.122	0.008	28.36,	29.02
235	RH10 ISLAND PARK	18-21	13	-0.880	<.01	29.96	29.70	0.40	17.75	8.70	20.70	0.256	-0.014	29.65,	30.27
238	RH10 JACKSON PEAK	23-28	21	-0.153	50.69	53.00	52.90	0.20	19.09	10.00	18.10	0.043	~0.002	52,47,	53.53
275	RHI5 LOLO PASS	18-20	11	-0.316	34,45	46.08	45.90	0.30	18,15	4,90	23,10	0.096	-0.005	45,53,	46,63
	RH10 LOOKOUT	18-21		0.772	0.19		44.60	0,60	20.74		13,60			44.54,	
284	RH20 LOST LAKE	18-23		0.045	84.35		70.00	0.90	17.30			-0.038		69.78,	
285 292	RH10 LOST-WOOD DIVIDE RH10 MAGIC MOUNTAIN	24 - 28 24 - 28	16	-0.186 0.603	47.39 1.34		40.40 39.70	0.20 0.40	15.86 19.72	4.30	21,20 18,80	0.024 -0.175		40.03, 39.47,	
	RH10 MEADOW LAKE	18-20	12	0.692	1.25		32.10	0.20	15.62	7.80	16.20			31.86,	
306	RHIO MILL CREEK SUMMIT	23-28	18	0.840	<.01	33.26	32.80	0.90	14.78	4.70	19.10	-0.635	0.043	32.86,	33,66*
	RH10 MOONSHINE			-0.435					16.24		23.50				
313	RH10 MOORES CREEK SUMMIT	18-24	24	0.857	<.01		55.00	1.50	17.15		24.30	-0.905	0.053	54.97,	56.21
314	RH10 MOOSE CREEK	19-28	8	-0.230	58,29	29.46	28.70	1.20	14.03	5.20	21.50	0.162	-0.011	29.11,	29.81
315	RH10 MORGAN CREEK	23-28	19	0.627	0.40	26.55	26.40	0.20	15.78	5,60	20.70	-0,106	0.007	26.24,	26.86
	RH15 MOSQUITO RIOGE			-0.877	<.01		59.10	1.00	18.44	10.40		1.186		59.13,	
	RH10 MOUNTAIN MEAOOWS	22-28		0.753	<.01		45.10	0.70	13.46		29.10			44.76,	
	RH10 MUO FLAT	18-28		-0.944	<.01		20.50	0.50	21.65	14.30	27,70	0.414 0.058		20.52, 34.72,	
	RH05 0XF0R0 SPRING RH10 PRAIRIE	19 - 28		-0.274 -0.907	28.71 <.01		35.00 29.50	0.10 1.30	22.04		23.40	1.104		29.76,	
405	RH15 SAVAGE PASS	18-20	12	0.612	3,45	45.28	40.90	10.20	16.86	7,10	18,20	-5.863	0,347	44.78,	45.78
	RH15 SCHWEITZER BASIN			-0.346	9.04		43.30	0.20	16.54		15.50	0.093		42.93,	
	RH15 SECESH SUMMIT			-0.963	<.01		47.70	2.30	16,69		25.70	1,336		48,34,	
416	RH15 SHANGHI SUMMIT	18-28	44	-0.864	<.01	47.03	46.80	0.40	19.65	10.10	20.40	0.370		46.56,	
410	RH10 SHEEP MTN.	23-28	21	0.801	<.01	29.71	29.60	0.30	16.30	4.70	22.70	-0.155	0.010	29,36,	30.06

^{*} INDICATES THAT ONE OR MORE MEASURED PRECIPITATION DATA VALUES FELL DUTSIDE THE SPECIFICATION ERROR BAND.

TABLE 28. REVISED PRECIPITATION-TEMPERATURE 1986 FLUTTER STUDY STATISTICS FOR SMOTEL SITES IN IOAHO (CONTINUED).

					P/T		DANG	- OE DE	ADINGS					RATURE ECTION		
			AUGUST		CORRE-	RANDOM			RECIP	TEMPE	RATURE	DANCE		ATION	SPECIE	ICATION
CITE	SENSOR	SNOTEL	1986		LATION	PROB		(INCHES				C)		a + bT)	ERROR	
		STATION NAME	DATE	NOBS		(PCT)	AVE	MIN	OELTA	AVE	MIN	0ELTA	a	ь	LOW	HIGH
	RH10 SHERWI	 IN	25-28		-0.790	0.22		31.10					0.404	-0.020	31.10,	
429	RH10 SLUG C	CREEK OIVIDE	23-28	18	0.362	13.98	43.31	42.70	0.80	15.56	8,20	17.70	-0.208	0.013	42.85,	43.77*
434	RHO5 SOMSEN	RANCH	23-28	21	0.820	<.01	33.42	33.30	0.30	14,68	7.00	14.80	-0.251	0.017	33.05,	33.79
437	RH15 SOUTH	MTN.	18-20	12	0.682	1.45	34.45	34.20	0.60	22.70	17.60	14.30	-0.503	0.022	34.18,	34.72*
444	RH10 SQUAW	FLAT	22-28	24	-0.874	<.01	43.33	43.00	0.50	18,83	6.50	25.10	0.409	-0.022	42.84,	43.82
453	RH10 STICK	NEY MILL	22-28	19	-0.961	<.01	19.80	19.20	1.10	15.02	1.50	24.50	0.628	-0.042	19.54,	20.06
463	RH15 SUNSET	Г	18-22	17	-0.963	<.01	49.21	48.60	1.20	18.71	11.90	14.00	1.527	-0.082	48.75,	49.67
465	RH20 SWEDE	PEAK	18-21	12	0.286	36.76	30.73	30,60	0.30	17.95	10.50	18.50	-0.089	0.005	30.43,	31.03
482	RH15 TRINIT	FY MTN.	23-28	17	-0.855	<.01	62.89	62,60	0.40	12.70	4.40	18.70	0.230	-0.018	62.13,	63.65
497	RH15 VIENNA	MINE	23-28	16	0.751	0.07	48.51	48.40	0.40	16.52	9.00	16.80	-0.287	0.018	48.01,	49.01
507	RH10 WEST E	BRANCH	22-28	24	-0.800	<.01	42.84	42.50	0.60	21.13	11.20	21.50	0.530	-0.025	42.43,	43.25
511	RH10 WHITE	ELEPHANT	25-28	12	0.879	0.01	55.98	55.90	0.20	16.27	10.40	13.70	-0.261	0.016	55.43,	56.53
518	RH10 WILDHO	ORSE OIVIDE	22-28	27	0.453	1.75	35.39	34.80	1,60	17.99	8.60	21.80	-0.554	0.031	35,02,	35.76*

^{*} INDICATES THAT ONE OR MORE MEASURED PRECIPITATION DATA VALUES FELL OUTSIDE THE SPECIFICATION ERROR BAND.

TABLE 29. REVISEO PRECIPITATION-TEMPERATURE 1986 FLUTTER STUDY STATISTICS FOR SNOTEL SITES IN MONTANA.

				P/T		RANG	GE OF RE	AO INGS					RATURE ECTION		
	SENSOR SNOTEL TYPE STATION NAME	AUGUST 1986 OATE		LATION	PROB	FOR A VE	(INCHES	i)	(0	RATURE	C)	(c =	ATION a + bT)	ERROR	
	TIFE STATION NAME				(PCT)			OELTA	AVE		OELTA	a 	b 	LOW	H I GH
	PR15 BAOGER PASS			-0.085	64.39		44.80	0.30		-0.80		0.015	-0.001	44.32,	45.56
	PRIO BARKER LAKES			-0.623	0.08		34.00	0.20		-6.70		0.030		33.57,	-
	PRIO BASIN CREEK PRIO BEAGLE SPRINGS	25-28	8	-0.335 0.086	26.30 84.05		21.80	0.10 0.10	13.63 11.30		21.30	0.033		21.58,	
	PRIO BEAVER CREEK			-0.476	1.86		33.00	0.10		-0.90	16.10 21.50	-0.008 0.040		22.03, 32.61,	
47	PR15 BLACK BEAR	18-20	12	-0.768	0.35	60.40	60.30	0.20	13.32	2.20	21.20	0.109	-0.008	59.63,	61.17
	PR 10 BLACK PINE			-0.486	0.87		21.10	0.10	14.24	-	22.80	0.051	-0.004		
	PR10 BL000Y 0 ICK			-0.542	1.36	-	26.50	0.10	14.67		31.70	0.028		26.22,	-
	PR10 BOULOER MOUNTAIN PR10 BOX CANYON	22 - 28 23 - 28		-0.191 0.203	36.10 46.85		40.30 21.70	0.20 0.10	13.66 14.39		23.20 22.80	0.029 -0.005		39.85, 21.52,	
64	PR10 BOZN EXP FARM	21-27	23	0.724	<.01	21.09	21.00	0.20	21,62	11.60	19,20	-0.214	0.010	20.89,	21.29
78	PR10 CALVERT CREEK	18-21	13	-0.715	0.60		19.60	0.10	15.39		23.60	0.075		19.40,	
81	PR 10 CARROT BASIN	21 - 28	26	0.353	7.65	44.20	44.10	0.10	11.77	0.00	21.60	-0.018	0.001	43.60,	44.80
	PR10 CASHE CREEK			-0.659	0.02		22.30	0.20	•	-0.90	•	0.066	-0.006	22.12,	22.74
100	PR 10 CLOVER MEADOW	21 - 28	27	-0.143	47.66	32.59	32.50	0.10	12.75	-0.40	25.60	0.005	-0.001	32.14,	33.04
103	PR10 COLE CREEK	21-28	27	-0.448	1.89	28.14	27.90	0.40	12.30	1.00	21.20	0.109	-0.009	27.77,	28.51
105	PR10 COMBINATION	21 - 28	26	-0.801	<.01	15.23	15.00	0.40	14.57	1.80	26.50	0.164	-0.011	15.03,	15.43*
108	PRIO COPPER BOTTOM			-0.098	73.77		22.00	0.10	17.62	4.70	30.30	0.002		21.75,	
	RH15 COPPER CAMP	22 - 28		0.946	<.01		42.60	0.60	17.50		21.00	-0.553		42.44,	
121	PRIO CRYSTAL LAKE	22 - 28	25	-0.488	1.34	32,67	32.60	0.20	13.86	-0.70	24,90	0.061	-0.004	32,22,	33.12
126	PR 10 OALY CREEK	22-28	19	-0.199	41.32	22.08	22.00	0.30	14.92	1.30	27.60	0.036	-0.002	21.79,	22.37
129	PR10 OARKHORSE LAKE	23-28	20	-0.583	0.69	45.04	44.90	0.30	14.05	6.50	16,00	0.111	-0.008	44.53,	45.55
130	PR 10 OEADMAN CREEK			-0.547	0.83		27.30	0.10		-2.20		0.027		26.93,	
	PR10 01VIOE	25-28	9	0.179	64.54		24.30	0.10	12,61		13.40			24.12,	
149	PR10 OUPUYER CREEK	18-27	40	0.796	<.01	25.74	25.20	1.40	14.16	2,80	24.60	-0.811	0.057	25.42,	26.06*
160	PR10 EMERY CREEK	20-28	29	-0.303	11.01	32.33	32.00	0.60		-1.30		0.065	-0.007	31.88,	32.78
	PR15 FISHER CREEK			-0.615	0.13		51.40	0.20		-1.00		0.028		50.77,	
	PR15 FLATTOP MTN.			-0.210	49.13		84.30	0.20	14.87		20.40	0.035		83.30,	
	PR10 FROHNER MEAOOW			-0.698	0.01		22.20	0.10	12.23	1.10		0.070		21.97,	
191	PR10 GRAVE CREEK	22 - 28	26	-0.342	8.73	44.08	43,80	0.50	13,65	2.30	22.90	0.080	-0.006	43.53,	44.63
201	PR10 HANO CREEK			-0.642	1.33	26.24	26.10	0.20	15.76	1.40	28,80	0.050	-0.003	25.90,	26.58
	RH15 H00000 BASIN			-0.531	0.20		66.40	0.20		10.40		0.105	-0.006	•	
	PR 10 KRAFT CREEK	18-28		0.100	58.70		36.30	0.20	18.11		25.00	-0.008		35.99,	
	PRIO LAKEVIEW RIOGE	22 - 28 23 - 28		-0.442	3.07		29.40	0.30	14.94		24.10	0.086	-0.006		
263	PR10 LEMHI RIOGE	23 - 28	17	0.358	15.77	25,44	25.40	0.10	14.23	6,00	18,10	-0.050	0,003	25.15,	25,15
	PR10 LICK CREEK	22-25		0.374	20.85		27.50	0.10				-0.027		27.15,	
				-0.189											
	PR10 MANY GLACIER			-0.635	6,63		48.30	0.10			26.90			47.67,	
	PRIO MONUMENT PEAK			-0.260	21.92		35.10	0.10		-1.50		0.018		34.68, 49.70.	
320	PRIO MOSS PEAK	25-27	9	-0.400	28,57	50.21	49.90	0.60	16,06	9.80	12.80	0.275	-0.017	49.70,	50.72
	PR 10 MOUNT LOCKHART			-0.609	0.04		37.60	0.10			30.10	0.037		37.07,	
	PRIO MULE CREEK			-0.718	0.07		26.20	0.60	13.24		26.50	0.289		26.07,	
	PRIO NEVAGA CREEK PRIO NEZ PERCE CAMP	21 - 28 21 - 28		0.688 0.065	0.01		25.90 30.00	0.10 0.30	12.94		28.30 26.60	-0.033 -0.001		25.56, 29.72,	
	PR 15 NO ISY BASIN			-0.267	74.22 26.98		55.10	0.10	14.49		14.80	0.040		54.59,	
344	PRIO NORTHEAST ENTRANCE	21-25	14	0.186	52.47	23.59	23.50	0.10	10.38	-0.20	22.70	-0.004	0.001	23,27,	23.91
	PR 10 PICKFOOT CREEK			-0.171	42.49		32.10	0.20	15.35		21.60	0.025	-0.001		
	PR10 PIKE CREEK	25-28		0.286	42.29		39.60	0.20	17.10			-0.042	0.002	39,19,	40.13
	PR 10 PLACER BASIN			-0.237	30.06		31.10	0.20			21.50	0.009		30.76,	
372	PRIO PORCUPINE	23 - 28	18	-0,615	0.66	23,20	23.10	0.20	15,17	4.00	26.10	0.086	-0.006	22.92,	23.48

[.] INDICATES THAT ONE OR MORE MEASURED PRECIPITATION OATA VALUES FELL OUTSIDE THE SPECIFICATION ERROR BAND.

TABLE 29. REVISED PRECIPITATION-TEMPERATURE 1986 FLUTTER STUDY STATISTICS FOR SNOTEL SITES IN MONTANA (CONTINUED).

				P/T		RANG	E OF RE	ADINGS				TEMPER CORRE	RATURE ECTION		
		AUGL	ST	CORRE-	RANDOM	FOR	ZERO F	RECIP	TEMPE	RATURE	RANGE	EQU/	ATION	SPECIF	ICATION
SITE	SENSOR SNO	TEL 198	6	LATION	PROB		(INCHES	()	(D	EGREES	C)	(c = a	+ bT)	ERROR	BAND
		ON NAME DAT	E NOBS	(R)	(PCT)	AVE	MIN	DELTA	A VE		DELTA	a	b	LOW	HIGH
	PR10 ROCKER PEA	K 22-2	8 24	-0.233	27,28	29.53	29.50	0.10	11.36			0.030	-0.002		
395	PR10 S FORK SHI	ELDS 21-2	8 24	0.032	88.23	38.04	38.00	0.10	11.24	0.60	18.30	-0.002	0.000	37.53,	38.55
397	PR10 SADDLE MTN	. 23-2	8 13	0.455	11.84	35.88	35.80	0.10	14.16	6.30	20.70	-0.031	0.002	35.47,	36.29
421	PR10 SHOWER FAL	LS 23-2	8 18	0.205	41.35	42.76	42.70	0.10	12,44	4.10	20.30	-0.022	0.001	42.24,	43.28
425	PR10 SILVER RUN	22-2	8 24	-0.581	0.28	14.33	14.20	0.20	12.35	3.40	18.90	0.062	-0.005	14.15,	14.51
427	PR10 SKALKAHO S	UMMIT 22-2	8 18	-0.505	3.24	35,12	35.00	0.20	9.53	-0.40	21.70	0.051	-0.006	34.64,	35,60
428	RH15 SKYLARK TR	AIL 20-2	8 29	-0.742	<.01	45.14	45.00	0.30	16.58	9.80	16,90	0.242	~0.015	44.69,	45.59
443	PR10 SPUR PARK	22-2	8 32	-0.593	0.03	35,67	35,60	0.10	11,28	-0.70	22.80	0.048	-0.005	35,18,	36,16
448	RH15 STAHL PEAK	18-2	6 34	-0.077	66.32	52.14	52.00	0.30	12.82	1.60	20.90	0.018	-0.001	51.46,	52.82
471	PR10 TEPEE CREE	K 25-2	8 12	-0.205	52.23	26.14	26.10	0.10	15.02	8,40	16.70	0.027	-0.002	25.86,	26.42
488	PR10 TWELVEMILE	CREEK 22-2	8 18	0.464	5.22	42.86	42.80	0.20	15.24	1.40	26.00	-0.051	0.003	42.30.	43.42
489	PR15 TWIN LAKES	21-2	8 28	-0.881	<.01	63.12	63.00	0.20	14.75	2.80	27.40	0.145	-0.009	62.32,	63.92
500	PR10 WALDRON	20-2	8 24	-0.131	54.14	26.23	26.10	0.40	10.29	-0.60	25.10	0.015	-0.002	25.87,	26.59
503	PRIO WARM SPRIN	GS 21-2	8 28	-0.150	44.66	43.32	43.30	0.10	8,65	-2.10	22.80	0.005	-0.001	42.70,	43.94
510	PR10 WHISKEY CR	EEK 18-2	1 12	-0.613	3.40	36.64	36,60	0.20	12.82	-2.90	30,10	0.062	-0.005	36.10,	37.18
513	PR10 WHITE MILL	22-2	8 23	-0.042	84.78	42.92	42.80	0.20	9.37	-2.70	26.50	0,005	0.000	42.29,	43.55
526	PR 10 WOOD CREEK	22-2	8 25	-0.473	1.68	25,49	25,40	0.10	16.38	4.30	23,20	0.033	-0.002	25,18,	25.80

^{*} INDICATES THAT ONE OR MORE MEASURED PRECIPITATION DATA VALUES FELL OUTSIDE THE SPECIFICATION ERROR BAND.

TABLE 30. REVISED PRECIPITATION-TEMPERATURE 1986 FLUTTER STUDY STATISTICS FOR SNOTEL SITES IN NEVADA.

		A UGUST		P/T CORRE-	RANDOM		E OF RE		TEMPF	RATURE	RANGE		CATURE ECTION	SPECIF	ICATION
SITE	SENSOR SNOTEL	1986		LATION	PROB		(INCHES			EGREES			+ bT)	ERROR	
	TYPE STATION NAME	OATE	NOBS		(PCT)	AVE	MIN	DELTA	AVE	MIN	DELTA	a .	b	LOW	HIGH
	PR 10 BEAR CREEK			-0.211	19,02		35,40	0.20	9.34	0.20	19.50	0.028		35.09,	
	PR 10 BERRY CREEK	22~27		-0.053	89.18		27.60	0.10	12.22		11.70	0.003	-0.002	-	
	RH10 BIG BEND	24-28		-0.642	1,32		18.10	0.30	19.12		17.50	0.185	-	18.12.	
	RH10 BIG CREEK SUM	20-26		0.536	0.57		23.80	0.20	17,77		14.50			23,65,	
	RH10 BIG MEADOW	18-28		0.953	<.01		52.40	0.50	17.00	-	19.20	-0.543		52.11,	
55	RH15 BLUE LAKES	18-28	16	0.237	11.21	49.00	48.90	0.10	15,11	6 90	17 20	-0.012	0.001	48.46.	40 54
	RH10 BUCKSKIN LOWER	20-28		0.380	2,45		25.00	0.20	23.16			-0.088	-	24.87.	-
	RH10 CEDAR PASS	18-25		0.869	<.01		40.90	0.40	14.69			-0.323		40.60,	
	PR 10 CORRAL CANYON	21-26		0.000	100.00		30.10	0.00	17.96		16.20	0.000		29.79,	
	RH15 CSS LAB	22-28		-0.955	<.01		85.00	1.10	16.83		17.20	0.946		84.56,	
175	DUILO DIAMOND DEAK	20.24	17	0 666	0.35	20.07	20.00	0.10	10 44	0.00	17 20	0 127	0.007	10.06	20.20
	RH10 DIAMOND PEAK	20-24		-0.666 -0.059	0.35		20,00	0.10	18,44		17.20	0.127		19.86,	2.08*
	PR 10 O I SASTER PEAK	20-28		0.837	73,26	2,06	1.90 50.70	0.30 0.40	21.89 17.36		21.90	0.010 -0.245	-0.001	50.31,	
	RH10 DISMAL SWAMP RH10 OORSEY BASIN	18-28 21-28		-0.857	<.01 <.01		32.90	0.40	18,60		19.10	0.330		32.77,	
	RH10 ORAW CREEK	18-28		0.934	<.01		24.80	1,60	16.83			-1.255		25.19,	
167	DULE COOSTTC DAGG	10.20	41	0.000	4.01	£1 06	60.70	1.50	13.70	4 10	15.70	1 417	0.115	60.32	61 00#
	RH15 EBBETTS PASS RH15 ECHO PEAK	18-28		0.929 -0.746	<.01		60.30 74.00	1.50	12.30 18.65	12.60	12.90	-1.413 1.220		60.32, 74.01,	
	RHO5 FALLEN LEAF PC	23-28		-0.740	<.01 1.09	-15.07		1.40 5.30	15.16		24.80	1,141		-14.88,	
167	PRIO FAWN CREEK	18-28		-0.122	45.32	-	38.80	0.10	17.32	-	22.00	0.008		38,37,	
	RH10 GOAT CREEK	22-28		-0.488	2.11	-	31.50	0.30	13.61	-	14.30	0.097		31.33,	
	DE 10. OD 1111 TE DE 111		•	2 222	100.00	74 70	74 70	0.00	** **	14 20	12.60	0.000	0.000	74 41	74.00
	PRIO GRANITE PEAK	18-20		0.000	100.00		34.70	0.00	19.09	14.20		0.000 0.087		34.41, 35.99,	
193		22-26		-0.504	1.97		36,30	0.10	19.57 15.44	9.70	14.60	0.087		43.87.	
207 228	RH10 HEAVENLY VALLEY RH10 INDEPENDENCE CREEK	18-28 18-28		-0.788 -0.692	<.01 <.01		44.20 50.30	0.20 0.40	19,59	4.60	10.80 26.70	0,165		49.88,	
229		18-28		-0.818	<.01		53.10	0.10	-	10.90	13.40	0.173		52.64,	
	PR 10 JACK CREEK UPPER	21-28		-0.474	1.08		30.90	0.10	19.07	8.30		0.058		30.65,	
	PRIO JACKS PEAK	21-28		-0.766	<.01		41.00	0.20	17.60	8.30	16.70	0.182		40.62,	
	RH10 LAMANCE CREEK	22-28		0.593	0.28		-6.30	1.10	20,20		19.70			-5.71,	
258	RH10 LAMOILLE #3	20-26		0.295	20.64		35,90	0.40		-50.00	80.30	-0.012		35.00,	
201	RH10 LAUREL ORAW	21-28	וכ	-0.724	<.01	31,94	31.80	0.20	18,59	5,10	24.50	0.136	-0.007	31.58,	22,20
	RH10 LEAVITT MEADOWS	22-27		-0.977	<.01		44.10	0.50	17.22		23.60	0.405		43.81,	
	PRIO LOBDELL LAKE	23-27		-0.458	15.69		34.80	0.10	11,51	5,60	17.60	0.036		34.48,	
	PR 10 MARLETTE LAKE	18-28		0.0D0	100.00		46.70	0.00	15.87	7.50	16.40	0.000		46.19,	
	RH15 MT ROSE SKI AREA PR15 MT. ROSE	18-28 18-28		0.087 0.068	56.12 68.82		76.60 42.80	0.20 0.20	14.92 12.34	7,80 3,70	15,50 17,40	-0.025 -0.008	-	75.87, 42,39,	
			-	••••		•	•	••							
369	RH10 POISON FLAT	21-28	29	-0.616	0.03	40.87	40.80	0.20		3.40		0.066		40.36,	-
370	RH05 POLE CREEK R.S.	22-28	23	0.736	<.01	22,61	22,50	0.40				-0.318			
	RH15 RUBICON #2	18-28		0.927	<.01		56.70	0.60	-			-0.764		56.39,	
	RH10 SEVENTYSIX CREEK	24-28		0.907	<.01	-	23,80	0.10	18.35	-	-	-0.142		23.60,	
435	RH15 SONORA PASS	22-28	26	-0.914	<.01	43,63	43,30	0.60	15.79	6,10	18.40	0.413	-0.026	43.13,	44.13
441	RH10 SPRATT CREEK	18-28	27	0.768	<.01	45.25	44.80	0.90	18.94	8.20	22.50	-0.595		44.77,	
445	RH15 SQUAW VALLEY G.C.	18-28	42	-0.864	<.01	-4.12	-5.50	2.30	15.40	10.40	11.40	2,608		-4.08,	
467	PR 10 TAHOE CITY CROSS	18-28	37	0.773	<.01	50.25	50.00	0.50	17.64			-0.323	0.018	49.72,	50.78
469	RH10 TAYLOR CANYON	22-28	26	0.546	0.38	13.93	13.90	0,10	19.62	3.50	27.30	-0.054		13.76,	
487	PR 10 TRUCKEE #2	18-28	31	-0.397	2.68	42.10	42.00	0.20	19.12	7.60	21.80	0.037	-0.002	41.64,	42.56
498	PRIO VIRGINIA LAKES	18-25	33	-0.712	<.01	29.44	29.30	0.20	12.42	3.80	17.70	0.148	-0.012	29.08,	29.80
	RH15 WARD CREEK #3	18-28		0.869	<.01		91.70	0.50	16,52		22.90			90.85,	
501															
	RH10 WARO MOUNTAIN			-0.778	<.01	34.47	34.20	0.40	15.43	7.70	16.50	0.293	-0.019	34.10,	34.84

^{*} INDICATES THAT ONE OR MORE MEASURED PRECIPITATION DATA VALUES FELL OUTSIDE THE SPECIFICATION ERROR BAND.

TABLE 31. REVISEO PRECIPITATION-TEMPERATURE 1986 FLUTTER STUDY STATISTICS FOR SNOTEL SITES IN OREGON.

NO	SENSOR SNOTEL TYPE STATION NAME	AUGUST 1986 OATE	NO8S		PROB (PCT)		SE OF RE ZERO P (INCHES MIN	REC 1P		RATURE EGREES MIN	C) OELTA	CORRI EQU/ (c = : a	RATURE ECTION ATION a + bT) b	SPECIFICATION ERROR BANO LOW HIGH
	RH10 AOIN MTN	20-26		-0.417	3,40	38,62	38,50	0.20	15,17	1.10	23.80	0.069	-0.004	38,11, 39,13
2	RH15 ANEROIO LAKE #2	22-28	25	0.765	<.01	43.40	43.30	0.20	13.15	3,50	23.90	-0.112	0.008	42.86, 43.94
	RH10 ARBUCKLE MTN	25-28		0.792	0.21		32.90	1.00			11.20	-1.467	0.076	33.18, 33.76*
	PRIO BEAVER RESERVOIR	18-28		-0.548	<.01		27.10	0,10	19.39		26,10	0.065	-0.004	. , .
42	RH15 BIG REO MOUNTAIN	18-28	40	0.290	6.90	52,07	51,90	0.40	18,25	11,10	15,10	-0.141	0,008	51.57, 52.57
44		18-28		0.353	2,55	58,90	58,80	0.20	19.57	9.20	18.30	-0.094	0.005	58.29, 59.51
	RH15 BILLIE CREEK OIVIOE			-0.908	<.01		51.60	1.40	17.51		27,90	0.852		51.64, 52.96*
	RH15 BLAZEO ALDER	18-28		-0.820	<.01	101,10	-	1.20	20.81		24.70	1.022		100.06, 102.14
	RH10 BLUE MOUNTAIN SPRING RH10 BOURNE	21-28	40 25	0.768 -0.818	<.01 <.01		33.10 36.20	1.30 0.80		11.40		-1.079 0.639		33.35, 34.05* 36.27, 36.97*
61	PO 10 DOWNAN COOLNCO	21 20	26	0.600	۰ 01	24 12	24 10	0.10	10 46	0.10	20.30	0.007	0.005	22 07 24 22
	PRIO BOWMAN SPRINGS RH15 CASCAGE SUMMIT	21 - 28 18 - 28		-0.699 0.926	<.01 <.01	-	24.10 60.80	0.10 1.10	19.46 17.74		20.30	0.097 -0.852		23.87, 24.37
	PRIO CHEMULT ALTERNATE	23-27		-0.353	19.71	-	28.50	0.10	16.34		29.30	0.025		28.16. 28.90
	RH15 CLACKAMAS LAKE	18-28		0.528	0.01	-	44,60	0.30	17,85			-0,105		44.18, 45.30
	RH15 CLEAR LAKE	18-28			<.01		41.40	0.60	-	10.30		0.512	-	41.37, 42.19
102	RH15 COLO SPRINGS CAMP	18-28	43	0.863	<.01	60.83	60.00	2,40	18,33	7.70	20.00	-2,346	0.128	60.17, 61.49*
117		18-28		-0.725	<.01		20.50	0.20	20.22		23.00	0.144		20.37, 20.81
127	RH20 OALY LAKE	18-28		-0.792	<.01		79.80	0.90	21.40		20.80	0.710		79.45, 81.03
133	RH10 OERR.	20-28	36	-0.608	<.01	25.91	25,60	0.50	19.28	7.60	22,10	0.213	-0.011	25.63, 26.19
134	RH15 01AMONO LAKE	18-28	41	0.898	<.01	47.57	46.90	1.30	17.85	3.50	27.20	-0.714	0.040	46.98, 48.16
161	RH10 EMIGRANT SPRINGS	18-28	49	-0.756	<.01	34.95	34.70	0.80	21.29	9.00	25.80	0.599	-0.028	34.59, 35.31*
168	RH15 FISH CREEK	20-28	35	-0.862	<.01	46.79	46.10	1.30	15.48	7.90	14.70	0.878	-0.056	46.29, 47.29
170	RH15 F1SH LK.	18 - 28	42	0.708	<.01	43,10	42,60	1.30	20.40	5.70	28.90	-0.733	0.036	42.60, 43.60
174		18-28		0.789	<.01	21.07		31.70	21.45			-29.880		20.87, 21.27
186	RH10 GOLD CENTER	18 - 28	35	0.909	<.01	22,55	21,60	2.00	19.97	5,60	25.70	-1.782	0.089	22.29, 22.81
194	PR 10 GREENPOINT	18-28	43	0.063	68.92	71,50	71,10	0.70	18.69	8.70	19.90	-0.037	0.002	70.75, 72.25
	RH15 HIGH RIOGE	18-26		0.867	<.01		41.90	1.30				-1.756		42.19, 42.91*
215	RH20 HOGG PASS	18-28		-0.909	<.01	-	80,20	1.50	18,27	-	25.90	1.046		79.83, 81.89
217		18-28		-0.564	<.01		66.10	0.50	18.08		15.30	0.266		65.73, 67.01
224	RHIO HYATT PRAIRIE	18-28	40	0.861	<.01	29.32	28.80	1.40	17.97	7.00	22,20	-0.957	0.053	29.00, 29.64
234		23-28		•	0.11		65,90	0.60	15,62	-	30.00	0.237		65,27, 67,09
	RH20 JUMP OFF JOE	18-28		0.860	<.01	-	79.60	1.30	19.54	-	22.80	-0.965		79.22, 80.94
	RH15 KING MOUNTAIN		18	1,000	100.00	-	60.10	0.10	12.89	11.20		-0.679		59.61, 60.77
251	• •	21-28		-0.751	<.01		24.70	0.90	22.75		29.90	0.568		24.83, 25.41*
271	KHID LITTLE MEADOWS	23-28	21	0.530	1,33	84.81	84.00	1.50	19.29	7.50	20,90	-1.005	0,052	83.89, 85.73
	PRIO LUCKY STRIKE			-0,661	<.01	-	25.20	0.20	18.26	-	20.30	0.136		25.00, 25.54
291				-0.110	50.55		20.30	0.20		10.10		0.031		20.15, 20.55
	RHI5 MARION FORKS			-0.808	<.01		79.40	0.50	16.34		28.00	0.248		78.80, 80.60
300				-0.069	76.04		90.40	0.80		13.00		0.046		89.94, 91.82
321	RH15 MOSS SPRINGS	21-20	50	-0.935	<.01	40.09	48.00	1.40	17.06	2.20	28.30	0.743	-0.044	48.07, 49.31
324		18-20		-0.631	5.02		94.60	0.40	16.08	10.60	9.70	0.434		93.97, 95.83
326		21-26		-0.023	92.90		43,10	0.20	13,88		17.10	0,001		42.71, 43.65
329		18-28		0.019	90.79		63.40	0.30	18.11	8.20	19.60	-0.005		62.87, 64.23
341	PR15 NEW CRESCENT LAKE RH20 NORTH FORK	21 - 28 20 - 27		0.606 -0.811	0.27 <.01	130.53	37.20 129.20	0.60 2.40	17.43 17.97	3.60 5.00	26.80 26.50	-0.289 1.271		37.04, 37.96 128.99, 132.07
346	DD 10 OCHOOD READONS	10. 20	70	-0.046	. 01	26.00	26 60	0.70	10.06	0.00	21 70	0 (22	.0.07*	26 71 27 27
	PR10 OCHOCO MEA0OWS PR15 PEAVINE R10GE	18 - 28 18 - 28		-0.946 0.397	<.01 1.34		26.60 57.80	0.70	19.96 20.14		21.70	0.622 -0.062		26.71, 27.27° 57.27, 58.47
	PRIO QUARTZ MOUNTAIN	18-28		0.397	<.01		22,60	0.10 1.10	20.14	-	21.10	-0.965		22.94, 23.40
381				-0.949	<.01		51.90	1.10	20.95		26,40	0.855		51.83, 52.97
	RH20 REO HILL			-0.493	0.22		94.30	1.60	16.48	-	17.40	0.609		94.30, 96.28
					-	-	-	-					•	, , ,

^{*} INDICATES THAT ONE OR MORE MEASURED PRECIPITATION DATA VALUES FELL DUTSIDE THE SPECIFICATION ERROR BAND.

TABLE 31. REVISEO PRECIPITATION-TEMPERATURE 1986 FLUTTER STUDY STATISTICS FOR SNOTEL SITES IN OREGON (CONTINUED).

												TEMPER	RATURE		
				P/T		RANG	E OF RE	A0 INGS				CORRE	ECTION		
		AUGUST	Г	CORRE-	RANDOM	FOR	ZERO P	RECIP	TEMPE	RATURE	RANGE	EQU/	ATION	SPECIF	ICATION
SITE	SENSOR SNOTEL	1986		LATION	PR08		(INCHES)	(0	EGREES	C)	(c ≃ ;	a + bT)	ERROR	BAN0
_	TYPE STATION NAME	OATE		(R)	(PCT)	AVE		OELTA			OELTA	a	-	LOW	НIGН
	PR10 ROARING RIVER			0.861	<.01		69.00					-1.510			
391	RH10 ROCK SPRINGS	18-21	12	-0.710	0.96	15.17	15.10	0.10	20.39	8.40	24.40	0.076	-0.003	15.01,	15.33
396	RH20 SAODLE MOUNTAIN	18-28	47	-0.875	<.01	75.59	74.70	1.50	19.66	8.90	20.60	1.472	-0.075	74.80,	76.38*
399	RH15 SALT CREEK FALLS	18-28	48	-0.904	<.01	63.61	62.90	1.30	19.45	9.40	19.00	1.158	-0.059	62.96,	64.26*
403	RH15 SANTIAM JCT.	18-28	42	0.124	43.24	67.75	67.30	0.70	18.86	2.20	31.00	-0.050	0.003	66.88,	68,62
406	RH10 SCHNE10ER MEAOOWS	18-22	11	0.551	7.89	48.81	48.50	0.60	14.12	4.50	21.40	-0.194	0.014	48.23,	49.39
412	RH20 SEINE CREEK	18-28	48	0.485	0.04	58.44	53.70	6.80	17.33	0.40	27.50	-2.438	0.14!	57.65.	59,23*
423	RH10 SILVER CREEK	18-28	33	0.834	<.01	25.30	24.50	1.90	19.52	7.30	24.00	-1.529	0.079	25.02,	25.58*
426	RH10 SILVIES	18 - 28	20	-0.145	54.16	15.53	15.40	0.20	19.56	10.30	16.80	0.024	-0.001	15.38,	15.68
4 3 3	PR15 SNOW MOUNTAIN	18-28	39	-0.768	<.01	26.05	25.90	0.40	18.09	7.40	18,90	0.270	-0.015	25.77,	26.33
450	RH10 STARR RIOGE	18-23	24	0.659	0.04	19.11	19.00	0.30	21,55	10.20	22.70	-0.218	0.010	18.92,	19.30*
455	PR10 STRAWBERRY	18-25	34	0.829	<.01	20.17	20.00	0.30	19.81	8.60	21.80	-0.264	0.013	19.96,	20.38
460	PR10 SUMMER RIM	25-28	12	0.702	1.09	27.57	25.40	4.60	11.35	5.70	12.90	-2.429	0.214	27.25.	27.89*
461	RH15 SUMMIT LAKE	18-28	44	0.156	31.05	1.54	-14.20	32.00	15.70	-0.60	33.00	-2.539	0.162	1.52,	1.56*
468	RH10 TAYLOR BUTTE	18-28	42	0.088	57.94	21.85	21.70	0,30	18.82	3.80	28.80	-0.012	0.001	21.58,	22.12
470	RH15 TAYLOR GREEN	18-28	44	-0.318	3.52	36.86	36.00	1.40	20.13	10.00	20.90	0.417	-0.021	36.49,	37.23*
472	RH15 THREE CREEKS MEADOW	18-28	34	-0.041	81.91	36.56	36.40	0.30	16.87	6.40	22.30	0.013	0.000	36.15,	36.97
474	RHIO TIPTON	18-23	23	0.757	<.01	25.13	24.90	0.70	19.97	8,10	23.90	-0.598	0.030	24.86,	25.40*
523	PR 10 WOLF CREEK			-0.444	8.52	-	22.70	0.10	31.88	-		0.046		22.43,	

^{*} INDICATES THAT ONE OR MORE MEASURED PRECIPITATION DATA VALUES FELL DUTSIDE THE SPECIFICATION ERROR BAND.

TABLE 32. REVISEO PRECIPITATION-TEMPERATURE 1986 FLUTTER STUDY STATISTICS FOR SNOTEL SITES IN UTAH.

		ALIONO		P/T	RANDOM		E OF RE	AOINGS	Truce	DATUDE	DANCE		CTION	605015	101710
CITE	SENSOR SNOTEL	AUGUS1 1986		CORRE-	PROB	FUR	(INCHES			RATURE			ATION		ICAT ION
	TYPE STATION NAME	DATE	NOBS		(PCT)	AVE		OELTA	AVE		OELTA	(c - a	a + bT) b	LOW	BANO HIGH
	UT10 ATWOOD LAKE			-0.473	0.40	29.93		1.60	9.75		13.10	0.438	-0.045	- •	-
	PRIO BEAVER OAMS PRIO BEAVER OLVIOE	24-28		0.895	<.01		31.20	1.30	14.79 15.22		15.80	-1.125	0.076 -0.003	31.33,	
	RH15 BEN LOMONO PEAK	22-28		-0.304 0.317	16.92 13.13		38.50 92.60	0.10 3.70	22.00	6.70 16.20	-	0.041 -1.523	-	93.06,	39.00
	RH10 BEN LOMONO TRAIL	21-28		0.227	23.66		63.30	2.60	17.10			-0.288		63.08,	
	THIT DEN EDMOND HOTTE	2. 20		0,22.	23,00	05	03,30	2,00			21	0,200	0.017	03,00,	01,10
	PR10 BIG FLAT	22-24	8	-0.719	4.44		36,00	0.10	7.24	2.80	11.80	0.062	-0.009	35,59,	36.49
	PR10 BLACK FLAT-U.M. CK			-0.547	5.29	24.35		0.30	10.81		16.40	0.102	-0.009		
	PR10 BOX CREEK			-0.176	56.42		26,20	0.20	13.13	-	14.20	0.037	-0.003		
	PR10 BROWN OUCK	25-28		0.753	0.46	1,61	1,50	0.20		-12.80		0.013	0.005		1.64
6 8	PR10 BUCK FLAT	24-28	16	0.343	19.36	32.05	35.50	0.20	-2.90	-12.80	32,00	0.008	0.003	35.00,	36.30
71	PR 10 BUG LAKE	22-28	22	-0.564	0.62	39.55	39,50	0.10	14.45	6.80	17.20	0.072	-0.005	39,11,	39,99
79	RH10 CAMP JACKSON	21-26	24	0.897	<.01	24.36	23.60	2.30	14.33	9.60	12,60	-2.390	0.167	24.11,	24.61
86	PR 10 CASTLE VALLEY	18-24	27	-0.375	5.38	22,46	22.30	2.00	15,01	6,70	16.30	0.612	-0.041	22,21,	22,71
	PR10 CHALK CREEK #1	18-28		-0.379	9,02		42,00	8.30	11.46		18,10	1.685	-0.147		
90	PR10 CHALK CREEK #2	22-28	24	0.654	0.05	32,59	32.50	0.20	15.33	9.50	12.90	-0.176	0.011	32.26,	32.92
93	PR10 CHEPETA	22-28	13	0.035	90.80	35.46	35,30	0.20	10,04	3.30	15.70	-0.003	0.000	35.02,	35.90
96	PR10 CLEAR CREEK #1	24-28		0.758	0.10	-	34.10	0.80	13,19	5.60		-0.522	-	34.17,	
97				-0.405	16.94		29.40	0.40	14,63	3.00		0.084	-0,006		
125	PR 10 CURRANT CREEK	21-28	29	-0.500	0.56	27.96	27.80	0.20	12.42	2,00	24.20	0.046	-0.004	27.60,	28.32
128	PR10 OANIELS-STRAWBERRY	18-28	43	0.701	<.01	39.70	39.00	3,30	16.79	5.20	26,50	-0.949	0.057	39.23,	40.17
136	RH10 OILL'S CAMP	21-25	18	-0.472	4.80	29.78	29.70	0.10	-5.96	-11.50	11.30	-0.036	-0.006	29.25,	30.31
144	PR10 OONKEY RESERVOIR	23-28	25	0.644	0.05	20.35	19.30	2.50	10.96	3.00	17.00	-1.080	0.098	20.10,	20.60
147	PR10 ORY BREAD PONO	21-28	13	0.297	32.45	35.79	35.70	0.10	13,35	9.10	14.10	-0.028	0.002	35.42,	36.16
	PR10 EAST WILLOW CREEK	24-28		0.618	0.48	1.24	0.90	0.80	13,35			-0.394	0.030		1.25
165	PR10 FARMINGTON	24-28	17	-0.852	<.01	67,28	67.20	0.20	15,48	9.30	13.50	0.245	-0.016	66.59,	67,97
166	RH10 FARNSWORTH LAKE	25-28	12	0.903	<.01	35.63	35.30	0.60	14.68	9.50	9.00	-0.912	0.062	35.27,	35.99
172	UT10 FIVE POINTS LAKE	22-28	24	0.712	<.01	32,68	31.70	1.50	36.07	26.00	19.40	-1.903	0.053	32,26,	33.10
175	PR10 FRANKLIN BASIN			-0.231	44.71		59.40	0.10	15.71	7.30	16.20	0.028	-0.002		
	RH10 GOOSEBERRY R.S.	25-28		0.065	85.74		29.00	0.30	16.02	9.20		-0.019		28.80,	
204	PR10 HARRIS FLAT	24-28	16	-0.765	0.05	18.18	18.10	0.20	15,45	8,10	16.60	0.169	-0.011	17,99,	18.37
206	PR 10 HAYDEN FORK	21-25	21	-0.067	77.19	40.38	40.30	0.20	14.10	5.40	16.30	0.009	-0.001	39.91,	40.85
210	PR 10 HEWINTA	21-26	23	0.850	<.01	34,71	33.40	3.10	11,10	1.10	19.70	-1.842	0.166	34.25,	35,17
211	PR10 HICKERSON PARK	21-27	24	0.856	<.01	23.83	23.20	1.70	11.38	2.50	17.20	-0.836	0.073	23.53,	24.13
216	PR10 HOLE-IN-ROCK	22-27		0.945	<.01	23.50	22.20	2.70	12.05			-1.690		23,20,	
221	PR10 HORSE R10GE	22-28	25	-0.402	4.66	48.48	48.30	0.40	16.04	10.20	10.50	0.220	-0.014	48.00,	48.96
231	PR10 INOIAN CANYON	18-21	13	0.004	98.84	27.05	27.00	0.10	20.01	12,60	18.70	0.003	0.000	26.80,	27.30
245	PR 10 KIMBERLY MINE	21-28	25	-0.440	2.76	38.46	38.30	0.30	13,61	7.00	13.80	0.090	-0.007	38.03,	38.89
	PR 10 KING'S CABIN	22-28	28	-0.634	0.02		25,10	0.40	12.09			0.158	-0.013		
	PR 10 KOLOB			0.600	1.09		30.30	0.30				-0.136		30.14,	
254	PR10 LAKEFORK #1	21 - 28	31	-0.298	10.40	-6.45	-6.50	0.10	-6.19	-14.40	30.10	-0.011	-0.002	-6,33,	-6.57
255	UT10 LAKEFORK BASIN	20-28	34	-0.724	<.01	35.59	35,20	0.60	9.81	3.40	13.50	0.287	-0.029	35.15,	36.03
260	RH10 LASAL MOUNTAIN			-0.253	36.23	33,67	33.60	0.20	14.36		12,60			33.31,	
	RH10 LILY LAKE			-0.820	<.01		37.30	0.30	12,61		19.40			36.94,	
	RH15 LITTLE BEAR			-0.805	<.01	-	52.50	0.50				0.477		52.32,	
270	PRIO LITTLE GRASSY	18-21	20	0.581	0.72	25.42	24.90	1.00	21.72	12,60	17.10	-0.729	0.034	25.19,	25.65

^{*} INDICATES THAT ONE OR MORE MEASURED PRECIPITATION DATA VALUES FELL OUTSIDE THE SPECIFICATION ERROR BAND.

TABLE 32. REVISEO PRECIPITATION-TEMPERATURE 1986 FLUTTER STUDY STATISTICS FOR SNOTEL SITES IN UTAH (CONTINUED).

													TEMPE	RATURE		
					P/T		RANG	E OF RE	AOINGS				CORR	ECTION		
			AUGUS1	Г	CORRE-	RANDOM	FOR	ZERO F	RECIP	TEMPE	RATURE	RANGE	EQU/	ATION	SPECIF	ICATION
SITE	SENSOR	SNOTEL	1986		LATION	PR 0B		(INCHES	5)	(0	EGREE\$	C)	(c =	a + bT)	ERROR	BANO
NO	TYPE	STATION NAME	OATE	NOB S	(R)	(PCT)	A VE	MIN	OELTA	AVE	MIN	OELTA	a	ь	LOW	HIGH
278	RHIO LONG	_	22-28	21	0.651	0.13	18.48	17.90	1.40	16.52	8,30	14.10	-0.992	0.060	18.28,	18.68*
279	PRIO LONG	G VALLEY JCT	24-28	20	-0.151	52.59	3.26	3.20	0.10	16.02	9.20	17.00	0.022	-0.001	3.23,	3.29*
293	PR10 MAMN	40TH-COTTONWOOD	25-28	16	-0.387	13.81	30.63	30.50	0.20	12.73	3.30	19.80	0.049	-0.004	30,25,	31.01
302	RHIO MERC	CHANT VALLEY	25-28	12	0.346	27.11	29.93	29.90	0.10	13.03	4.70	19,10	-0.030	0.003	29.57,	30.29
305	RH10 MIOW	VAY VALLEY	21-25	15	0.623	1.30	37.27	37.20	0.20	10.23	3,60	13,70	-0.098	0.009	36,81,	37.73
310	PR10 MONT	TE CRISTO	21-28	29	-0.177	35.83	51.51	51.40	0.20	11.50	5.10	15.70	0.034	-0.003	50.90,	52,12
318	RHIO MOSE	BY MTN.	21-28	29	-0.934	<.01	-6.09	-6.40	0.60	13,46	6.00	15.80	0.413	-0.031	-6.02,	-6.16*
357	PRIO PARL	LEY'S SUMMIT	24-28	14	0.164	57.64	38.19	38,10	0.10	20.71	13.00	15.50	-0.015		37.85,	
358	PRIO PAYS	50N R.S.	21-26	22	-0.675	0.05	35.00	34.80	0.50	14.91	8.60	14.30	0.277	-0.018	34.63,	35.37
363	PRIO PICK	KLE KEG	21-26	19	0.145	55.49	30.03	30.00	0.10	12.19	6,00	11.50	-0.022	0.002	29.69,	30.37
366	RHIO PINE	E CREEK	24-27	13	-0.610	2.69	31.19	31.10	0.20	16.15	8,60	18.10	0.076	-0.005	30.86,	31.52
385	PRIO REO	PINE RIDGE	24-28	16	-0.930	<.01	33.82	33.50	0.70	12.18	2.80	19,40	0.476	-0.039	33.39,	34.25
390	RH10 ROCK	CREEK	23-28	20	-0.823	<.01	30.19	29.80	0.70	12.48	5.80	15.10	0.475	-0.038	29.84,	30.54*
393	PR10 ROCK	KY BASIN-SETTLEME	21-25	18	-0.172	49.50	48,31	48.30	0.10	15.70	10.20	14.30	0.011	-0.001	47.83,	48.79
411	PR10 SEEL	LEY CREEK	18-28	45	-0.068	65.99	28.00	27.90	0.10	-4.82	-12.50	30.80	-0.005	0.000	27.49,	28.51
431	PR 10 SMIT	TH & MOREHOUSE	22-28	25	0.379	6.15	43.00	42.90	0.20	16,61	4.60	23.50	-0.038	0.002	42.49,	43.51
451	PR 10 STEE	EL CREEK PARK	21-24	12	0.606	3.65	34.44	34.40	0.10	4.62	0.70	10.00	-0.044	0.010	33.98,	34.90
456	PR10 STRA	AWBERRY OIVIOE	20-28	33	-0.129	47.42	38.09	38.00	0.20	19.21	9.30	21.30	0.017	-0.001	37.70,	38.48
473	RH10 TIME	PANOGOS OIVIOE	22-28	22	-0.754	<.01	52.45	51.80	1.10	18.09	10.70	15.00	0.896	-0.049	51.94,	52.96*
476	PR10 TON	Y GROVE LAKE	22 - 28	24	-0.491	1.48	67.02	67.00	0.10	16.52	6.70	20.60	0.055	-0.004	66.27,	67.77
481	PR10 TRIA	AL LAKE	23-28	24	0.278	18.80	58.00	57,90	0.10	9.91	2.90	15.70	-0.015	0.001	57.27,	58.73
486	RH10 TROU	JT CREEK	24-28	18	-0.402	9.82	-3.07	-3.40	0.50	36.34	4.40	52.80	0.136	-0.004	-3.02,	-3,12*
495	PR 10 VERN	NON CREEK	22-25	15	-0.503	5.57	29.63	29.50	0.20	21.23	15.10	14.90	0.162	-0.008	29.39,	29.87
506	PR10 WEBS	STER FLAT	24-27	13	-0.159	60.45	29,56	29.50	0.10	17.26	10.40	15.10	0.030	-0.002	29,27,	29.85
515	PR10 WHIT	TE RIVER #1	23-25	11	-0.248	46.19	27.75	27.70	0.10	14.84	5.40	16.70	0.030	-0.002	27.43,	28,07
516	PR10 W105	STOE #3	23-28	20	-0.428	5.94	20.02	19.90	0.30	-2.80	-10.50	32.30	-0.008	-0.003	19.67,	20,37

^{*} INDICATES THAT ONE OR MORE MEASURED PRECIPITATION DATA VALUES FELL OUTSIDE THE SPECIFICATION ERROR BAND.

TABLE 33. REVISEO PRECIPITATION-TEMPERATURE 1986 FLUTTER STUDY STATISTICS FOR SNOTEL SITES IN WASHINGTON.

													TEMPER			
					P/T			E OF RE						CTION		
			AUGUST			RANDOM	FOF	ZERO F			RATURE		•	TION		ICAT 10N
	SENSOR	SNOTEL	1986		LAT 10N	PR0B		(INCHES			EGREES			+ bT)		BAND
	TYPE	STATION NAME	DATE			(PCT)	AVE	MIN	DELTA	AVE	M1N	DELTA	a	ь 	LOW	HIGH
52	RH15 BLEV	WETT PASS	23-25	10	0.895	0.04	34.64	34.30	0.90	16.49	10.70	15.40	-0.961	0.058	34.30,	34.98*
72	RH25 BUM	PING RIOGE	20-26	25	0.937	<.01	57.73	57.50	0.50	16.91	7.90	20.30	-0.532		57.11,	-
73	RH15 BUNG	CHGRASS MDW	18-21	16	-0.614	1.14	44.53	44.20	0.60	15.93	-1.00	27.90	0.289		43.91,	
113	RH15 COR	RAL PASS			-0.926	<.01		53,30	0.60	16.13		20.20	0.447		52.99,	
115	RH15 COU	GAR MOUNTAIN	18-27	21	0.256	26.34	86.30	86.10	0.40	16.31	10.30	14.60	-0.105	0.006	85.45,	87.15
169	RH15 F1SI	H LAKE	18-28	41	0.902	<.01	49.54	49.20	0.80	15.34	3,20	25.00	-0.398	0.026	48.92,	50.16
192	RH10 GREI	EN LAKE	18-28	37	-0.040	81.44	33.23	33.20	0.10	16.80	8.40	17.80	0.003	0.000	32.88,	33.58
197	RH10 GRO	USE CAMP	18-24	27	-0.395	4.13	30,67	30,60	0.10	17.40	9.40	15.40	0.067	-0.004	30.36,	30,98
205	RH20 HAR	TS PASS	21-26	19	-0.015	95.01	78.09	77.80	0.50	13.05	6.10	16.00	0.005	0.000	77.20,	78.98
241	RH25 JUNI	E LAKE	18-28	46	-0.693	<.01	138.98	138.70	0.60	19.93	9.50	20.70	0.448	-0.022	137.56,	140.40
277	RH25 LONE	E PINE	18-28	41	-0.684	<.01	77.01	76.70	0.80	16.06	8.40	15.70	0.566	-0.035	76,20,	77.82
289	RH25 LYM	AN LAKE	18-25	32	0.369	3.78	63,12	62.80	0.50	17,08	6.80	22.90	-0.154	0.009	62.42,	63.82
308	RH20 MIRE	ROR LAKE	18-28	37	-0.713	<.01	36,43	35.50	1,60	13.16	4.80	18.80	0.719	-0.055	36.00,	36.86*
317	RH20 MORS	SE LAKE	18-26	34	0.758	<.01	70.94	70.10	2.00	17.89	9.40	17.40	-1.545	0.086	70.21,	71.67*
347	RH25 OLA	LL1E MEADOWS	18-28	29	-0.702	<.01	103.84	103.70	0.30	16.72	7.60	21.20	0.204	- 0.012	102.71,	104.97
352	RH25 PAR	ADISE	18-25	30	0.690	<.01	102.28	102.20	0.20	15.72	7.50	19.20	-0.140	0.009	101.16,	103.40
354	RH15 PARI	K CREEK RIDGE	18-28	41	0.485	0.13	57.83	57.10	1.30	14.61	6.60	20.30	-0.620	0.042	57.18,	58.48*
364	RH15 P16	TAIL PEAK	18-28	34	0.567	0.04	64.20	6.70	150.00	3,16	-50.00	100.00	-2.696	0.854	62.17,	66.23*
368	RH25 PLA	INS OF ABRAHAM	18-28	48	-0.706	<.01	102.84	102,60	0.50	18,98	10.30	18,90	0.270	-0.014	101.82,	103,86
371	RH10 POP	E RIOGE	18-28	38	-0.705	<.01	-3.32	-3.50	0.40	18.58	5.40	25.30	0.198	-0.010	-3,28,	-3,36*
374	RH25 POTA	ATO HILL	22-28	25	-0.184	37.88	53.79	51.10	6.40	17.01	3.60	25.30	0.957	-0.056	53.13,	54.45
379	RH10 QUAR	RTZ PEAK	18-28	37	0.725	<.01	5.96	5.90	0.20	20.75	11.90	16.60	-0.187	0.009	5.90,	6.02*
382	RH15 RAII	NY PASS	20-27	29	0.812	<.01	-5.98	-6.10	0.30	13,64	4.80	18,90	-0.194	0.014	-5.91,	- 6.05*
398	PR15 SALI	MON MEAOOWS	18-22	17	0.446	7.30	16.74	16,60	0.20	17,98	4.90	21.50	-0.075	0.004	16.54,	16.94
404	RH15 SAS	SE RIDGE	18-28	42	-0.380	1.31	51.41	51.30	0.30	21.61	10.00	24.00	0.102	-0.005	50.90,	51,92
417	RH20 SHE	EP CANYON	18-24	32	-0.165	36.54	104.08	103.90	0.40	17,68	8.70	17.40	0.061	-0.004	102.99,	105,17
439	RH15 SPE	NCER MEADOW	18-28	47	0.705	<.01	81.41	81.20	0.80	22.54	8.90	27.80	- 0.478	0.021	80.56,	82.26
440	RH10 SPII	RIT LAKE	18-26	35	0.136	43.52	92.05	91.90	0,60	16.39	7.90	19.80	-0.053	0.003	91.06,	93.04
449	RH25 STA	MPEDE PASS	24-28	7	-0.699	8.05	80.17	79.50	1.30	17.13	10.40	16.70	1.178	-0.069	79.38,	80.96
4 52	RH20 STE	VENS PASS	21 - 28	25	-0.892	<.01	77,77	77.20	1.10	17,77	8,50	22,20	0.738	-0.042	76,95,	78.59
457	RH25 STR	AWBERRY LANDING	21-28	32	-0.605	0.02	80.32	79.60	1.30	17.24	8.90	18,60	0.882	-0.051	79.48,	81.16
464	RH25 SUR	PRISE LAKES	18-28	43	-0.895	<.01	81.50	81.00	0.80	26.25	14.50	26.60	0.639	-0.024	80.59,	82.41
477	RH10 TOU	CHET #2	18 - 25	30	0.851	<.01	48.20	48.10	0.30	18,96	12.40	18.00	-0.344	0.018	47.76,	48,64
484	RH10 TRO	UGH	20-25	18	0.769	0.01	32.80	32.30	1.20	15.89	9.00	14.30	-1.078	0.068	32.46,	33.14*
493	RH10 UPP	ER WHEELER	18-28	41	0.560	0.01	25.09	24.60	1,30	20.16	9,60	20,60	- 0.631	0.031	24.84,	25.34
514	PR10 WHI	TE PASS E.	19-22	13	0.110	71.94	36.35	36.30	0.10	18,53	9,60	15.50	-0.022	0.001	35.98,	36.72

^{*} INDICATES THAT ONE OR MORE MEASURED PRECIPITATION DATA VALUES FELL OUTSIDE THE SPECIFICATION ERROR BAND.

TABLE 34. REVISEO PRECIPITATION-TEMPERATURE 1986 FLUTTER STUDY STATISTICS FOR SNOTEL SITES IN WYOMING.

SITE SENSOR SNOTEL 1986 LATION PROB (R) (PCT) AVE MIN DELTA AVE MIN DELTA A B LOW					P/T			E OF RE						RATURE ECTION		
No Time STATION NAME OATE NAME OATE NAME STATION NAME OATE NAME NAME OATE NAME NAME OATE NAME			AUGUST	•	CORRE-	RANDOM	FOR	ZERO P	RECIP	TEMPE	RATURE	RANGE	EQU	AT ION	SPECIF	ICATION
10 PRIO BALD MTN, 22-26 22 -0.415 5.48 30.65 30.65 30.60 0.10 9.52 2.00 17.10 0.034 -0.004 30.24 14 14 14 14 16 15 15 15 15 15 15 15								(INCHES)	(0	EGREES	C)	(c =	a + bT)	ERROR	BANO
10																HIGH
14 PRIOS BASE CAMP 19-20 10 - 0,922 0,010 11,30 11,00 0,40 14,89 5,50 22,10 0,291 -0,003 0,003 12,75 17 RHIO BATIL MOUNTAIN 19-26 41 - 0,228 13,10 16,87 16,87 16,80 16,80 0,40 14,65 3,60 26,10 0,068 -0,003 12,75 18 RHIO BERSTROPH LAKE 19-20 0,097 0,10 12,21 31,60 1,30 1,50 0,00 1,60 0,008 -0,003 12,55 18 RHIO BLASCANTER 19-20 0,097 0,10 32,21 31,60 1,30 1,50 0,00 1,00 0,004 -0,001 0,005 0,007 0,005 18 RHIO BLASCANTER 19-20 0,0230 0,10 32,21 31,60 1,30 1,50 0,00 1,00 0,004 -0,001 0,005 0,007 0,005 0,007 0,005																
17 PHIO BATTLE MOMENTAN 21-24 13 - 0.418 12-26 13 - 0.418 12-26 13 - 0.418 12-26 13 - 0.418 12-28 13 - 0.418 12-28 13 - 0.418 12-28 13 - 0.418 12-28 13 - 0.418 12-28 13 - 0.418 12-28 13 - 0.418 12-28 13 - 0.418 12-28 13 - 0.418 12-28 13 - 0.418 12-28 13 - 0.418 12-28 13 - 0.418 12-28 13 - 0.418 12-28 13 - 0.418 12-28 13 - 0.418 12-28 13 - 0.418 12-28 13 - 0.418 13-28 13		•													-	
25	7 F	RH10 BATTLE MOUNTAIN	21-24	15	-0.418											
22. 23. 24.															-	
50 R. R. B.						-	-	-								
50	3 F	RH10 BIG SANOY OPENING	18 - 20	9	0.897	0-10	32,21	31.60	1.30	15.50	5.00	21.90	-0.733	0.047	31.83.	32.59*
53 PRIO BLINO BUIL SIM 19-20 11 -0.570 6.70 41.00 41.20 0.20 14.43 7.90 18.00 0.08 40.00 40.50 5 PRIO BROOKLYN LAKE 22-28 25 -0.182 38.51 41.00 41.10 0.10 4.32 53.00 19.00 -0.001 -0.001 40.51 5 PRIO BROOKLYN LAKE 22-28 25 -0.182 38.51 41.00 41.10 0.10 4.32 53.00 19.00 -0.001 -0.001 40.51 41.10) F	PR10 BLACKWATER			-						-	-	-	-		-
57 RNIO BONE SPRINGS OIV 22-28 22-08 25-0.182 25-5.61 35.51 41.00 41.00 41.00 41.00 41.00 40.00 20.00 -0.00 22.11 74 RRIO BURGESS JUNCTION 19-20 31 -0.017 <.01															-	
65 PRIO BROOKLYN LAKE 22-28 25 -0.182 38.51 41.20 41.00 0.10 4.32 -3.00 19.00 -0.001 -0.001 40.51 47 PRIO BURRESS JUNCTION 19-28 37 -0.714 4.01 21.85 21.80 0.10 5.53 -5.00 30.00 0.000 -0.006 33.8 88 PRIO CANTON 21-25 17 0.532 2.77 20.98 20.80 0.40 14.16 12.20 41.70 -0.847 0.002 31.7 85 PRIOS CASPER MIN, 21-25 17 0.532 2.77 20.98 20.80 0.40 14.16 12.20 41.70 -0.847 0.002 31.7 85 PRIO CLOUO PEAK RESERVOIR 19-22 15 0.0697 0.38 31.29 31.20 0.20 16.39 -1.60 15.60 0.007 -0.002 42.00 99 PRIO CLOUO PEAK RESERVOIR 19-22 15 0.0697 0.38 31.29 31.20 0.20 16.39 -1.60 15.60 0.071 -0.012 30.8 114 PRIO COTTOMNOCO LAKE 24-28 17 0.084 74.91 47.55 47.40 0.20 12.31 31.00 19.40 -0.009 0.001 46.79 115 PRIO DOUISER CREEK 22-28 13 0.085 0.092 48.18 47.80 11.0 13.03 3.60 25.00 -0.027 24.20 137 PRIO O INMOCOY 18-28 38 -0.443 0.945 24.90 24.00 1.00 13.03 3.00 26.00 0.037 -0.027 24.20 143 PRIO O OME LAKE 24-28 17 0.084 0.065 25.80 25.80 0.10 9.24 -0.30 19.40 -0.009 0.001 46.79 18-18 PRIO DOUISE PEAK 25 22 25 13 0.055 0.005 0.055 25.40 0.001 13.46 18.00 10.00	7 F	PR 10 BONE SPRINGS 01V	23-28	22	-0.253										•	
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114 PRITO COUTTOMORDO LAKE 12-28 17 0_084 74_91 47_53 47_40 0_20 12_31 3_10 19_40 0_009 0_001 46_9_115 PRITO COULTER CREEK 137 PRITO COULTER CREEK 138 -0_443 0_042 48_18 47_80 1_10 11_10 13_03 3_60 2_40 0_429 0_033 47_51 137 PRITO COULTER CREEK 18-24 29 0_433 1_91 23_89 23_40 0_90 15_67 8_70 19_60 0_037 -0_027 24_55 11_1 RIDO EAST RIM OLVING PEAK 18-24 29 0_433 1_91 23_89 23_40 0_90 15_67 8_70 19_60 0_033 0_001 23_6 11_1 RIDO EAST RIM OLVING PEAK 143 PRITO GOME LAKE 22-28 24 0_0466 0_05 25_22 25_20 0_010 9_24 0_030 19_40 0_048 0_005 25_25 11_1 RIDO EAST RIM OLVING 18-20 13 0_840 0_05 25_32 25_20 0_010 9_24 0_07_001 19_40 0_048 0_005 25_0 15_1 RIDO EAST RIM OLVING 18-20 13 0_840 0_05 25_32 25_20 0_020 16_9 3_0 0_07_001 0_157 0_010 25_0 0_159 RITO EVENING STAR 18-21 13 0_435 13_72 49_05 49_00 0_10 13_46 4_30 19_40 0_054 0_054 0_054 18_9 18_15 RRASY LAKE 22-28 14 0_976 0_01 57_29 56_60 0_10 13_46 4_30 19_40 0_054 0_054 56_6 196 RITO GROS VENTRE SUMNIT 25_28 11 0_0107 75_51 30_08 30_00 0_20 9_51 0_050 15_70 0_014 0_013 2_00 0_014 0_					-		-	-					•			
114 PRITO COUTTOMORDO LAKE 12-28 17 0_084 74_91 47_53 47_40 0_20 12_31 3_10 19_40 0_009 0_001 46_9_115 PRITO COULTER CREEK 137 PRITO COULTER CREEK 138 -0_443 0_042 48_18 47_80 1_10 11_10 13_03 3_60 2_40 0_429 0_033 47_51 137 PRITO COULTER CREEK 18-24 29 0_433 1_91 23_89 23_40 0_90 15_67 8_70 19_60 0_037 -0_027 24_55 11_1 RIDO EAST RIM OLVING PEAK 18-24 29 0_433 1_91 23_89 23_40 0_90 15_67 8_70 19_60 0_033 0_001 23_6 11_1 RIDO EAST RIM OLVING PEAK 143 PRITO GOME LAKE 22-28 24 0_0466 0_05 25_22 25_20 0_010 9_24 0_030 19_40 0_048 0_005 25_25 11_1 RIDO EAST RIM OLVING 18-20 13 0_840 0_05 25_32 25_20 0_010 9_24 0_07_001 19_40 0_048 0_005 25_0 15_1 RIDO EAST RIM OLVING 18-20 13 0_840 0_05 25_32 25_20 0_020 16_9 3_0 0_07_001 0_157 0_010 25_0 0_159 RITO EVENING STAR 18-21 13 0_435 13_72 49_05 49_00 0_10 13_46 4_30 19_40 0_054 0_054 0_054 18_9 18_15 RRASY LAKE 22-28 14 0_976 0_01 57_29 56_60 0_10 13_46 4_30 19_40 0_054 0_054 56_6 196 RITO GROS VENTRE SUMNIT 25_28 11 0_0107 75_51 30_08 30_00 0_20 9_51 0_050 15_70 0_014 0_013 2_00 0_014 0_	. ,	2010 OLOUG BELV DECENVOID	10.22	15	0.607	0.70	71 20	71 20	0.20	6 70	1.60	15.60	0.071	0.012	30.05	71 77
116 PRIIO COLLIER GREEK											-	-				
137 PRIJO DINNOCOY 18-28 38 -0.443 0.54 24.91 24.40 1.40 11.41 1.80 26.00 0.307 -0.027 24.55 141 RIHO DIVIDE PEAK 18-24 29 0.433 1.91 23.89 23.40 0.90 15.67 8.70 19.60 -0.337 0.021 23.56 141 RIHO DIVIDE PEAK 18-24 29 0.433 1.91 23.89 23.40 0.90 15.67 8.70 19.60 -0.337 0.021 23.56 141 RIHO DIVIDE 18-20 13 0.484 0.03 25.32 25.20 0.20 15.67 8.70 19.40 0.048 -0.005 25.41 13 RIHO DIVIDE 18-20 13 0.484 0.03 25.32 25.20 0.20 1.20 15.67 9.40 19.60 -0.167 0.010 25.01 15.81 RIHO DIVIDE 18-20 13 0.484 0.03 25.32 25.20 0.20 1.20 1.20 15.70 19.40 0.048 -0.005 25.41 15.81 RIHO DIVIDE 18-20 13 0.485 13.72 49.06 49.00 0.10 13.46 4.30 19.40 0.054 -0.004 48.4 80 RIHO ERINARS TARK 18-28 14 -0.455 13.72 49.06 49.00 0.10 13.46 4.30 19.40 0.054 -0.004 48.4 80 RIHO GROS VENTRE SUMMIT 25-28 11 -0.455 13.72 49.06 49.00 0.10 13.46 4.30 19.40 0.054 -0.004 48.4 80 RIHO GROS VENTRE SUMMIT 25-28 11 -0.455 13.72 49.06 49.00 0.10 13.46 4.30 19.40 0.054 -0.004 48.4 80 RIHO GROS VENTRE SUMMIT 25-28 11 -0.455 13.73 19.15 18.90 0.40 14.37 2.50 28.20 0.004 -0.005 15.4 50.6 12.0 12.0 12.0 12.0 12.0 12.0 12.0 12.0											-				-	
141 RH10 OIVIOE PEAK 18-24 29 0,433 1,91 23,89 23,40 0,90 15,67 8,70 19,60 -0.537 0,021 23,66 143 PR10 OME LAKE 22-28 24 -0.646 0,06 25,83 25,80 0,10 9,24 -0.30 19,40 0,048 -0.005 25,41 151 RH05 EAST RIM 01VIDE 18-20 13 0,840 0,03 25,32 25,20 0,20 16,69 9,40 19,60 -0.167 0,010 25,01 159 RH10 ELWHART PARK G,S, 23-28 22 0,721 0,011 31,11 30,50 1,30 12,93 6,20 15,70 -0.913 0,071 30,76 150 RH15 GRASSY LAKE 25-28 14 -0.976 <.01 57,29 56,60 1,20 13,46 4,30 19,40 0,054 -0.004 48,4 150 RH15 GRASSY LAKE 25-28 14 -0.976 <.01 57,29 56,60 1,20 13,75 4,40 20,50 0,740 -0.034 56,66 196 RH10 GROS VENTRE SUMNIT 25-28 11 -0.107 75,51 30,08 30,00 0,20 9,51 -0.50 21,70 0,014 -0.001 29,6 200 RH05 HAMS FORK 23-28 20 0,816 0,01 25,67 25,60 0,20 15,73 6,10 18,10 -0.133 0,008 25,31 214 PR10 HOBES PARK 18-28 40 -0.279 8,16 32,64 32,10 1,20 8,19 -1,80 25,40 0,046 18,22 222 RH10 INDIAN CREEK 25-28 13 0,901 0,040 14,20 47,00 0,30 13,84 7,60 12,90 -0.307 0,022 46,66 233 PR10 IRISH ROCK 18-28 16 -0.915 4,13 20,14 19,80 0,70 14,55 5,50 19,30 -0.036 0,002 38,32 243 RH05 KENDALL R,S, 25-28 11 0,437 17,85 38,82 38,80 0,10 14,50 35,50 19,30 -0.036 0,002 38,32 244 RH10 KELLEY R,S, 25-28 11 0,437 17,85 38,02 38,02 38,02 38,03 12,15 5,50 19,30 -0.036 0,002 38,32 243 RH05 KENDALL R,S, 24-28 17 0,764 0,03 33,15 33,00 0,30 12,15 2,00 19,10 -0.106 0,000 32,7 248 RH10 LEWIS LAKE GIVIDE 18-2 39 -0.576 1,43 20,44 25,79 25,00 0,40 14,69 7,50 14,20 0,007 -0.000 12,7 255 RH10 LEWIS LAKE GIVIDE 18-2 13 0,732 0,44 25,79 25,60 0,60 15,09 7,50 22,30 0,004 -0.003 27,7 256 PR10 MR0UETF OREK 18-2 35 0,056 0,06 16,10 15,90 0,30 13,25 2,30 2,70 0,007 0,007 0,001 12,3 257 RH10 MROUETF PORDER 18-2 35 0,0566 0,06 16,10 15,90 0,30 13,25 2,30 2,70 0,079 0,000 12,3 258 RH10 LEWIS LAKE GIVIDE 18-2 35 0,0566 0,06 16,10 15,90 0,30 13,25 2,30 2,70 0,079 0,000 27,000 15,8 258 RH10 LEWIS LAKE GIVIDE 18-2 35 0,0566 0,06 16,10 15,90 0,30 13,25 2,30 2,70 0,007 0,007 0,000 15,8 259 RH10 LORDER PORDER 18-2 35 0,0566 0,06 16,10 15,90 0,30 13,25 2,30 2,70 0,009 0,000	-				-										•	
131 PRIO 00ME LAKE					-		-	-			-	-				
151 RHO5 EAST RIM OIVIOE 18-20 13 0,840 0,03 25,32 25,20 0,20 16,69 9,40 19,60 -0,167 0,010 25,00 159 RHO ELEMART PARK G.S. 23-28 22 0,721 0,01 31,11 30,50 1,30 12,93 6,20 15,70 -0,913 0,071 30,71 15 165 PRIO EVENING STAR 18-21 13 -0,435 13,72 49,06 49,00 0,10 13,46 4,30 19,40 0,050 -0,040 48,4 190 RH15 GRASSY LAKE 25-28 14 -0,976 c.01 57,29 56,60 1,20 13,75 4,40 20,50 0,740 -0,093 56,60 196 RH10 GROS VENTRE SUMMIT 25-28 11 -0,107 75,51 30,08 30,00 0,20 9,51 -0,50 21,70 0,014 -0,001 29,6 196 RH10 GROS VENTRE SUMMIT 25-28 11 -0,107 75,51 30,08 30,00 0,20 9,51 -0,50 21,70 0,014 -0,001 29,6 196 RH05 HAMS FORK 23-28 20 0,816 c.01 25,67 25,60 0,20 15,73 6,10 18,10 -0,133 0,008 25,30 203 PRIO HAMSEN SAMMILL 18-24 26 -0,433 2,73 19,15 18,90 0,40 14,37 2,50 28,20 0,084 -0,006 18,9 14 PRIO HOGBS PARK 18-28 40 -0,279 8,16 32,64 32,10 1,20 8,19 -1,80 25,40 0,132 -0,016 32,17 232 RH10 INDIAN CREEK 25-28 13 0,901 c.01 47,20 47,00 0,30 13,84 7,60 12,90 -0,307 0,022 46,60 233 PRIO HRISH ROCK 18-28 16 -0,515 4,13 20,14 19,80 0,70 8,91 0,70 24,90 0,179 -0,020 19,8 242 RH10 KELLEY R.S. 25-28 11 0,437 17,85 38,82 38,80 0,10 14,55 3,50 19,30 -0,036 0,002 38,3 43 RH05 KENDALL R.S. 24-28 17 0,764 0,003 33,15 33,00 0,30 12,15 2,80 19,10 -0,036 0,002 38,3 243 RH05 KENDALL R.S. 24-28 17 0,764 0,003 33,15 33,00 0,30 12,15 2,80 19,10 -0,036 0,002 32,76 18 BRIO LAPRELE CREEK 22-28 21 -0,075 74,50 28,00 27,70 0,90 11,60 0,20 25,20 0,004 -0,006 0,003 27,76 18 RTIO KIRNIN 18-28 39 -0,376 1,83 30,26 29,70 1,40 10,00 -1,30 26,60 0,234 -0,024 29,8 19 10 LAPRELE CREEK 22-28 17 0,764 0,003 32,15 33,00 0,10 11,69 7,50 14,20 0,004 -0,003 27,76 18 RTIO MARQUETTE 18-21 13 0,732 0,44 25,79 25,00 0,001 11,69 7,50 14,20 0,004 -0,003 27,76 18 RTIO MARQUETTE 18-21 13 0,732 0,44 25,79 25,00 0,001 11,69 7,50 14,20 0,004 -0,003 27,76 18 RTIO MARQUETTE 18-21 13 0,732 0,44 25,79 25,00 0,001 11,69 7,50 14,20 0,004 -0,003 27,76 18 RTIO MARQUETTE 18-21 13 0,732 0,44 25,79 25,00 0,001 11,69 7,50 14,00 0,007 -0,007 10,00 12,0 12,0 12,0 14,0 14,0 14,0 14,0 14,0 14,0		RHIO OTVIOE PEAK	10-24	29	0,433	1.91	23.09	23,40	0.90	10,07	0,70	19,00	-0,337	0.021	25,04,	24,14"
159 RH10 ELMART PARK G.S. 23-28 22 0.721 0.01 31.11 30.50 1.30 12.93 6.20 15.70 -0.913 0.071 30.76 163 RR10 EVENING STAR 18-21 13 -0.455 13.72 49.06 49.00 0.10 13.46 4.30 19.40 0.054 -0.004 48.4 190 RH15 GRASSY LAKE 25-28 14 -0.976 c.01 57.29 56.60 1.20 13.75 4.40 20.50 0.740 -0.054 56.61 56.61 180 RH15 GRASSY LAKE 25-28 14 -0.976 c.01 57.29 56.60 1.20 13.75 4.40 20.50 0.740 -0.054 56.61 196 RH10 GROS VENTRE SUMMIT 25-28 11 -0.107 75.51 30.08 30.00 0.20 9.51 -0.50 21.70 0.014 -0.001 29.61 19.00 RH105 HAMS FORK 23-28 20 0.816 c.01 25.67 25.60 0.20 15.73 6.10 18.10 -0.133 0.008 25.31 19.00 RH105 HAMSEN SAWMILL 18-24 26 -0.433 2.73 19.15 18.90 0.40 14.37 2.50 28.20 0.084 -0.006 18.9 14.97 19.00 RH10 HOBBS PARK 18-28 40 -0.279 88.16 32.64 32.10 1.20 8.19 -1.80 25.40 0.132 -0.016 32.17 19.10 HOBBS PARK 18-28 16 -0.515 4.13 0.901 c.01 47.20 47.00 0.30 13.84 7.60 12.90 -0.307 0.022 46.6 19.20 18.18 18-28 16 -0.515 4.13 0.901 c.01 47.20 47.00 0.30 13.84 7.60 12.90 -0.307 0.022 46.6 19.20 18.18 HOS KENDALL R.S. 25-28 11 0.437 17.85 38.82 38.80 0.10 14.55 3.50 19.30 -0.036 0.002 38.3 19.20 18.18 HOS KENDALL R.S. 24-28 17 0.764 0.03 33.15 33.00 0.30 12.15 2.80 19.10 -0.106 0.009 37.30 19.20 1	3 F	PR10 00ME LAKE	22-28	24	-0.646	0.06	25.83	25.80	0.10	9.24	-0.30	19.40	0.048	-0.005	25.48,	26.18
163 PR10 EVENING STAR 18-21 13 -0.435 13.72 49.06 49.00 0.10 13.46 4.30 19.40 0.054 -0.004 48.4 190 RH15 GRASSY LAKE 25-28 14 -0.976 c.01 57.29 56.60 1.20 13.75 4.40 20.50 0.740 -0.004 56.61 196 RH10 GROS VENTRE SUMMIT 25-28 11 -0.107 75.51 30.08 30.00 0.20 9.51 -0.50 21.70 0.014 -0.001 29.61 200 RH05 HAMS FORK 23-28 20 0.816 c.01 25.67 25.60 0.20 15.75 6.10 18.10 -0.133 0.008 25.31 205 PR10 HAMSEN SAMMILL 18-24 26 -0.433 2.73 19.15 18.90 0.40 14.37 2.50 28.20 0.084 -0.006 18.9 214 PR10 HOBBS PARK 18-28 40 -0.279 8.16 32.64 32.10 1.20 8.19 -1.80 25.40 0.132 -0.016 32.17 232 RH10 INDIAN CREEK 25-28 13 0.901 c.01 47.20 47.00 0.30 13.84 7.60 12.90 -0.307 0.022 46.61 242 RH10 KELLEY R.S. 25-28 11 0.437 17.85 38.82 38.80 0.10 1.45 3.50 19.30 -0.036 0.002 38.3 243 RH05 KENDALL R.S. 24-28 17 0.764 0.03 33.15 33.00 0.30 11.60 0.70 8.91 0.70 24.90 0.779 -0.020 19.81 245 RH05 KENDALL R.S. 24-28 17 0.764 0.03 33.15 33.00 0.30 11.60 0.70 8.91 0.70 0.23 0.036 0.002 38.3 259 RH10 LAPRELE CREEK 22-28 21 -0.075 74.50 28.00 27.70 0.90 11.60 0.20 25.20 0.029 -0.002 27.6 264 RH10 LEWIS LAKE 01VIDE 18-21 13 0.830 0.04 64.22 64.00 0.50 17.10 9.10 19.00 -0.310 0.018 63.51 259 PR10 LAPRELE CREEK 26-28 9 -0.646 6.00 23.06 23.00 0.10 14.65 7.04 0.00 0.70 0.70 0.02 27.6 259 PR10 LATRE RENCH 18-2 14 -0.058 84.40 22.29 22.20 0.20 15.35 3.00 25.80 0.011 -0.001 22.0 250 RH10 MADQUETTE 18-21 14 -0.058 84.40 22.29 22.20 0.20 15.35 3.00 25.80 0.011 -0.001 22.0 250 RH10 MADQUETTE 18-25 31 0.254 16.74 23.02 23.00 0.10 19.14 5.00 27.70 -0.029 0.001 22.7 250 PR10 MARQUETTE 18-27 18-20 18-	1 6	RHO5 EAST RIM OIVIOE	18-20	13	0.840	0.03	25.32	25,20	0.20	16.69	9.40	19.60	-0.167	0.010	25.06,	25.58
190 RH15 GRASSY LAKE 25-28 14 -0.976	9 F	RH10 ELKHART PARK G.S.	23-28	22	0.721	0.01	31.11	30.50	1.30	12.93	6.20	15.70	-0.913	0.071	30.76,	31.46*
196 RH10 GROS VENTRE SUMMIT 25-28 11 -0.107 75.51 30.08 30.00 0.20 9.51 -0.50 21.70 0.014 -0.001 25.67 25.60 0.20 15.73 6.10 18.10 -0.133 0.008 25.31 0.008 18.99 18.00 18.00 18.90 18.00 18.90 0.40 14.37 2.50 28.20 0.084 -0.006 18.90 18.90 18.00 18.90 0.40 14.37 2.50 28.20 0.084 -0.006 18.90 18.90 18.00 18.90 0.40 18.30 18.00 18.90 18.90 0.40 18.30 18.9	3 i	PR10 EVENING STAR	18-21	13	-0.435	13.72	49.06	49.00	0.10	13.46	4.30	19.40	0.054	-0.004	48,47,	49.65
200 RH05 HAMS FORK 23-28 20 0.816 <.01 25.67 25.60 0.20 15.73 6.10 18.10 -0.133 0.008 25.30 203 PRIO HANSEN SAMMILL 18-24 26 -0.433 2.73 19.15 18.90 0.40 14.37 2.50 28.20 0.084 -0.006 18.9 21.4 PRIO HOBBS PARK 18-28 40 -0.279 8.16 32.64 32.10 1.20 8.19 -1.80 25.40 0.132 -0.016 32.17 22 RH10 INDIAN CREEK 25-28 13 0.991 <.01 47.20 47.00 0.30 13.84 7.60 12.90 -0.307 -0.022 46.6 233 PRIO IRISH ROCK 18-28 16 -0.515 4.13 20.14 19.80 0.70 8.91 0.70 24.90 0.179 -0.002 19.8 242 RH10 KELLEY R.S. 25-28 11 0.437 17.85 38.82 38.80 0.10 14.55 3.50 19.30 -0.036 0.002 38.3 243 RH05 KENDALL R.S. 24-28 17 0.764 0.03 33.15 33.00 0.30 12.15 2.80 19.10 -0.106 0.009 32.7 248 PRIO KIRWIN 18-28 39 -0.376 1.83 30.26 29.70 1.40 10.00 -1.30 26.60 0.234 -0.024 29.8 259 RH10 LAPRELE CREEK 22-28 21 -0.075 74.50 28.00 27.70 0.90 11.60 0.20 23.20 0.029 -0.002 27.6 264 RH10 LEWIS LAKE 01VIOE 18-21 13 0.830 0.04 64.22 64.00 0.50 17.10 9.10 19.00 -0.310 0.018 63.51 272 PRIO LITTLE WARM 23-25 10 -0.557 9.43 28.12 28.10 0.10 11.19 3.90 16.20 0.040 -0.003 27.7 283 PRIO MARQUETTE 18-21 14 -0.058 88.40 22.29 22.20 0.20 15.55 3.00 27.70 -0.002 70.002 27.0 304 PRIO MIDDLE POWDER 18-25 31 0.254 16.74 23.02 23.00 0.10 19.14 5.00 27.70 -0.029 0.001 22.7 335 PRIO NOROOO 18-28 35 -0.666 0.03 63.68 63.50 0.40 10.09 2.70 15.40 0.016 -0.016 12.8 349 PRIO NORTH FRENCH CREEK 18-20 8 -0.830 1.07 47.06 47.00 0.10 10.68 5.10 18.00 0.073 -0.007 46.5 349 PRIO NORTH FRENCH CREEK 18-20 8 -0.830 1.07 47.06 47.00 0.10 10.68 5.10 18.00 0.073 -0.007 -0.000 11.6 349 PRIO NOROOO 18-28 44 -0.055 0.19 28.59 -5.50 0.40 10.09 2.70 15.40 0.016 -0.016 -0.016 22.0 349 PRIO OWL CREEK 18-25 30 -0.566 0.06 16.10 15.90 0.30 13.25 2.30 27.10 0.075 -0.006 15.8 350 PRIO PARKER PEAK 18-25 32 0.029 87.59 23.90 0.10 8.34 -1.10 20.00 0.009 0.009 23.5 351 PRIO PARKER PEAK 18-25 30 0.0566 0.06 16.10 15.90 0.00 14.05 4.40 19.90 -0.780 0.005 23.5 351 PRIO PARKER PEAK 18-25 32 0.029 87.59 23.90 23.90 0.10 14.05 4.40 19.90 -0.780 0.005 23.5 351 PRIO PARKER PEAK 1) F	RH15 GRASSY LAKE	25 - 28	14	-0.976	<.01	57.29	56,60	1.20	13.75	4.40	20.50	0.740	-0.054	56,60,	57.98*
203 PR10 HANSEN SAWMILL 18-24 26 -0.433 2.73 19.15 18.90 0.40 14.37 2.50 28.20 0.084 -0.006 18.99 214 PR10 HOBBS PARK 18-28 40 -0.279 8.16 32.64 32.10 1.20 8.19 -1.80 25.40 0.132 -0.016 32.1 232 RH10 INDIAN CREEK 25-28 13 0.901 4.01 47.20 47.00 0.30 13.84 7.60 12.90 -0.307 0.022 46.6 233 PR10 IRISH ROCK 18-28 16 -0.515 4.13 20.14 19.80 0.70 8.91 0.70 24.90 0.179 -0.002 19.8 242 RH10 KELLEY R.S. 25-28 11 0.437 17.85 38.82 38.80 0.10 14.55 3.50 19.30 -0.036 0.002 32.7 24.8 PR10 KIRWIN 18-28 39 -0.376 1.83 30.26 29.70 1.40 10.00 -1.30 26.60 0.234 -0.016 0.002 32.7 24.8 PR10 KIRWIN 18-28 39 -0.376 1.83 30.26 29.70 1.40 10.00 -1.30 26.60 0.234 -0.002 27.6 27.8 PR10 LAPRELE CREEK 22-28 21 -0.075 74.50 28.00 27.70 0.90 11.60 0.20 23.20 0.029 -0.002 27.6 28.8 PR10 LAPRELE CREEK 22-28 9 -0.646 6.00 23.06 23.00 0.10 14.69 7.50 14.20 0.007 -0.006 22.4 28.9 PR10 LOST CREEK 26-28 9 -0.646 6.00 23.06 23.00 0.10 14.69 7.50 14.20 0.007 -0.002 27.7 283 PR10 LOST CREEK 26-28 9 -0.646 6.00 23.06 23.00 0.10 14.69 7.50 14.20 0.007 -0.002 27.7 283 PR10 MARQUETTE 18-21 14 -0.058 84.40 22.29 22.20 0.20 15.35 3.00 25.80 0.011 -0.002 22.7 27.9 27.0 PR10 MIDDLE POWDER 18-25 31 0.254 16.74 23.02 23.00 0.10 14.69 7.50 14.20 0.007 -0.002 0.002 22.7 27.0 27.00 18.2	5 F	RH10 GROS VENTRE SUMMIT	25 - 28	11	-0.107	75.51	30.08	30.00	0.20	9.51	-0.50	21.70	0.014	-0.001	29,67,	30.49
214 PR10 HOBBS PARK) F	RHO5 HAMS FORK	23-28	20	0.816	<.01	25.67	25.60	0.20	15.73	6.10	18.10	-0.133	0.008	25.38,	25.96
232 RH10 INDIAN CREEK 25-28 13 0.901 <.01 47.20 47.00 0.30 13.84 7.60 12.90 -0.307 0.022 44.6 233 PR10 IRISH ROCK 18-28 16 -0.515 4.13 20.14 19.80 0.70 8.91 0.70 24.90 0.179 -0.020 19.8 242 RH10 KELLEY R.S. 25-28 11 0.437 17.85 38.82 38.80 0.10 14.55 3.50 19.30 -0.036 0.002 38.3 243 RH05 KENDALL R.S. 24-28 17 0.764 0.03 33.15 33.00 0.0 12.15 2.80 19.10 -0.106 0.009 32.7 248 PR10 KIRWIN 18-28 39 -0.376 1.83 30.26 29.70 1.40 10.00 -1.30 26.60 0.234 -0.024 29.8 259 RH10 LAPRELE CREEK 22-28 21 -0.075 74.50 28.00 27.70 0.90 11.60 0.20 23.20 0.029 -0.002 27.60 264 RH10 LEWIS LAKE OLVIOE 18-21 13 0.830 0.04 64.22 64.00 0.50 17.10 9.10 19.00 -0.310 0.018 63.5 272 PR10 LITTLE WARM 23-25 10 -0.557 9.43 28.12 28.10 0.10 11.89 3.90 16.20 0.040 -0.003 27.70 283 PR10 LOST CREEK 26-28 9 -0.646 6.00 23.06 23.00 0.10 14.69 7.50 14.20 0.087 -0.006 22.8 297 PR10 MARQUETTE 18-21 14 -0.058 84.40 22.29 22.20 0.20 15.35 3.00 25.80 0.011 -0.001 22.0 304 PR10 MIDDLE POWDER 18-25 31 0.254 16.74 23.02 23.00 0.10 19.14 5.00 27.70 -0.029 0.001 22.7 336 RH05 NEW FORK LAKE 18-20 8 -0.830 1.07 47.06 47.00 0.10 10.68 5.10 18.00 0.073 -0.007 46.5 342 PR10 NORTH FRENCH CREEK 18-20 8 -0.830 1.07 47.06 47.00 0.10 10.68 5.10 18.00 0.073 -0.007 46.5 343 PR10 OUD BATTLE 20-28 35 -0.566 0.03 63.68 63.50 0.40 10.09 2.70 15.40 0.116 -0.011 62.8 348 RH10 OLD BATTLE 20-28 35 -0.566 0.03 63.68 63.50 0.40 10.09 2.70 15.40 0.116 -0.011 62.8 349 PR10 OWL CREEK 18-20 11 -0.455 0.19 28.59 -5.30 37.70 10.23 -0.40 21.60 11.272 -1.102 28.2 350 PR10 PARKER PEAK 18-20 11 -0.455 0.19 28.59 -5.30 37.70 10.23 -0.40 21.60 11.272 -1.102 28.2 351 PR10 POWDER RIVER PASS 18-25 32 0.029 87.88 23.90 23.90 0.10 14.05 4.40 19.90 -0.780 0.005 31.53 375 PR10 POWDER RIVER PASS 18-25 30 0.026 <0.01 31.91 31.50 1.00 14.05 4.40 19.90 -0.780 0.005 31.53	3 1	PRIO HANSEN SAWMILL	18-24	26	-0.433	2.73	19.15	18,90	0.40	14.37	2.50	28.20	0.084	-0.006	18.91,	19.39*
233 PRIO IRISH ROCK 18-28 16 -0.515 4.13 20.14 19.80 0.70 8.91 0.70 24.90 0.179 -0.020 19.81 24.2 RH10 KELLEY R.S. 25-28 11 0.437 17.85 38.82 38.80 0.10 14.55 3.50 19.30 -0.036 0.002 38.32 243 RH05 KENDALL R.S. 24-28 17 0.764 0.03 33.15 33.00 0.30 12.15 2.80 19.10 -0.106 0.009 32.77 248 PRIO KIRWIN 18-28 39 -0.376 1.83 30.26 29.70 1.40 10.00 -1.30 26.60 0.234 -0.024 29.8 259 RH10 LAPRELE CREEK 22-28 21 -0.075 74.50 28.00 27.70 0.90 11.60 0.20 23.20 0.029 -0.002 27.61 27.81 27	1 i	PR 10 HOBBS PARK	18-28	40	-0.279	8.16	32.64	32,10	1.20	8.19	~1.80	25,40	0.132	-0.016	32.17,	33.11*
242 RH10 KELLEY R.S. 25-28 11 0.437 17.85 38.82 38.80 0.10 14.55 3.50 19.30 -0.036 0.002 38.32 243 RH05 KENDALL R.S. 24-28 17 0.764 0.03 33.15 33.00 0.30 12.15 2.80 19.10 -0.106 0.009 32.73 248 PR10 KIRKIN 18-28 39 -0.376 1.83 30.26 29.70 1.40 10.00 -1.30 26.60 0.234 -0.024 29.8 259 RH10 LAPRELE CREEK 22-28 21 -0.075 74.50 28.00 27.70 0.90 11.60 0.20 23.20 0.029 -0.002 27.60 27.60 27.70 28.00 27.70 0.90 11.60 0.20 23.20 0.029 -0.002 27.60 27.70 28.00 27.70 28.00 27.70 28.00 27.70 28.00 27.70 28.00 27.70 28.00 27.70 28.00 27.70 28.00 27.70 28.00 28.00 27.70 28.00 28.00 27.70 28.00 28.00 27.70 28.00 2	2	RH10 INOIAN CREEK	25-28	13	0.901	<.01	47.20	47.00	0.30	13,84	7.60	12.90	-0.307	0.022	46.69,	47.71
242 RH10 KELLEY R.S. 25-28 11 0.437 17.85 38.82 38.80 0.10 14.55 3.50 19.30 -0.036 0.002 38.32 243 RH05 KENDALL R.S. 24-28 17 0.764 0.03 33.15 33.00 0.30 12.15 2.80 19.10 -0.106 0.009 32.73 248 PR10 KIRKIN 18-28 39 -0.376 1.83 30.26 29.70 1.40 10.00 -1.30 26.60 0.234 -0.024 29.8 259 RH10 LAPRELE CREEK 22-28 21 -0.075 74.50 28.00 27.70 0.90 11.60 0.20 23.20 0.029 -0.002 27.60 27.60 27.70 28.00 27.70 0.90 11.60 0.20 23.20 0.029 -0.002 27.60 27.70 28.00 27.70 28.00 27.70 28.00 27.70 28.00 27.70 28.00 27.70 28.00 27.70 28.00 27.70 28.00 27.70 28.00 28.00 27.70 28.00 28.00 27.70 28.00 28.00 27.70 28.00 2	3 1	PRIO IRISH ROCK	18-28	16	-0.515	4.13	20.14	19.80	0.70	8.91	0.70	24.90	0.179	-0.020	19.87.	20.41*
243 RHO5 KENDALL R.S.																
248 PRIO KIRWIN 18-28 39 -0.376 1.83 30.26 29.70 1.40 10.00 -1.30 26.60 0.234 -0.024 29.8 259 RH10 LAPRELE CREEK 22-28 21 -0.075 74.50 28.00 27.70 0.90 11.60 0.20 23.20 0.029 -0.002 27.60 26.4 RH10 LEWIS LAKE 0IVIOE 18-21 13 0.830 0.04 64.22 64.00 0.50 17.10 9.10 19.00 -0.310 0.018 63.5 272 PRIO LITTLE WARM 23-25 10 -0.557 9.43 28.12 28.10 0.10 11.89 3.90 16.20 0.040 -0.003 27.77 283 PRIO LOST CREEK 26-28 9 -0.646 6.00 23.06 23.00 0.10 14.69 7.50 14.20 0.087 -0.006 22.8 297 PRIO MARQUETTE 18-21 14 -0.058 84.40 22.29 22.20 0.20 15.35 3.00 25.80 0.011 -0.001 22.0 304 PRIO MIDDLE POWDER 18-25 31 0.254 16.74 23.02 23.00 0.10 19.14 5.00 27.70 -0.029 0.001 22.7 336 RH05 NEW FORK LAKE 18-21 13 0.732 0.44 25.79 25.60 0.60 15.09 7.50 22.30 -0.243 0.016 25.5 342 PRIO NORTH FRENCH CREEK 18-20 8 -0.830 1.07 47.06 47.00 0.10 10.68 5.10 18.00 0.073 -0.007 46.5 345 PRIO NOWOOO 18-28 39 -0.615 <.01 11.79 11.70 0.20 12.99 1.70 24.60 0.058 -0.005 11.6 348 RH10 0L0 BATTLE 20-28 35 -0.566 0.03 63.68 63.50 0.40 10.09 2.70 15.40 0.116 -0.011 62.8 349 PRIO OWL CREEK 18-25 30 -0.586 0.06 16.10 15.90 0.30 13.25 2.30 27.10 0.075 -0.006 15.80 375 PRIO PARKER PEAK 18-28 44 -0.455 0.19 28.59 -5.30 37.70 10.23 -0.40 21.60 11.272 -1.102 28.2 361 PRIO PARKER PEAK 18-28 44 -0.455 0.19 28.59 -5.30 37.70 10.23 -0.40 21.60 11.272 -1.102 28.2 361 PRIO POWDER RIVER PASS 18-25 32 0.029 87.58 23.90 23.90 0.10 8.34 -1.10 20.60 0.002 0.002 51.36 375 PRIO POWDER RIVER PASS 18-25 32 0.029 87.58 23.90 23.90 0.10 8.34 -1.10 20.60 0.002 0.002 33.5 387 RH05 RENO HILL 21-28 26 0.926 <.01 31.91 31.50 1.00 14.05 4.40 19.90 -0.780 0.056 31.50										12.15	2.80	19.10	-0.106	0.009	32.73,	33.57
264 RH10 LEWIS LAKE 01VIOE 18-21 13 0.830 0.04 64.22 64.00 0.50 17.10 9.10 19.00 -0.310 0.018 63.50 272 PR10 LITTLE WARM 23-25 10 -0.557 9.43 28.12 28.10 0.10 11.89 3.90 16.20 0.040 -0.003 27.70 283 PR10 LOST CREEK 26-28 9 -0.646 6.00 23.06 23.00 0.10 14.69 7.50 14.20 0.087 -0.006 22.8 297 PR10 MARQUETTE 18-21 14 -0.058 84.40 22.29 22.20 0.20 15.35 3.00 25.80 0.011 -0.001 22.0 304 PR10 MIDDLE POWDER 18-25 31 0.254 16.74 23.02 23.00 0.10 19.14 5.00 27.70 -0.029 0.001 22.7 336 RH05 NEW FORK LAKE 18-21 13 0.732 0.44 25.79 25.60 0.60 15.09 7.50 22.30 -0.243 0.016 25.5 342 PR10 NORTH FRENCH CREEK 18-20 8 -0.830 1.07 47.06 47.00 0.10 10.68 5.10 18.00 0.073 -0.007 46.5 345 PR10 NOW000 18-28 39 -0.615 <.01 11.79 11.70 0.20 12.99 1.70 24.60 0.058 -0.005 11.6 348 RH10 OLO BATTLE 20-28 35 -0.566 0.03 63.68 63.50 0.40 10.09 2.70 15.40 0.116 -0.011 62.8 349 PR10 OWL CREEK 18-25 30 -0.586 0.06 16.10 15.90 0.30 13.25 2.30 27.10 0.075 -0.006 15.80 375 PR10 PARKER PEAK 18-28 44 -0.455 0.19 28.59 -5.30 37.70 10.23 -0.40 21.60 11.272 -1.102 28.2 361 PR10 PARKER PEAK 18-20 11 -0.173 61.09 51.98 51.90 0.30 15.13 4.80 22.10 0.039 -0.002 51.36 375 PR10 POWDER RIVER PASS 18-25 32 0.029 87.58 23.90 23.90 0.10 8.34 -1.10 20.60 0.002 0.000 23.5 387 RH05 RENO HILL 21-28 26 0.926 <.01 31.91 31.50 1.00 14.05 4.40 19.90 -0.780 0.056 31.50	В	PR10 KIRWIN							1.40	10.00	-1.30	26,60	0.234	-0.024	29.83,	30.69*
272 PR10 LITTLE WARM 23-25 10 -0.557 9.43 28.12 28.10 0.10 11.89 3.90 16.20 0.040 -0.003 27.70 283 PR10 LOST CREEK 26-28 9 -0.646 6.00 23.06 23.00 0.10 14.69 7.50 14.20 0.087 -0.006 22.8 297 PR10 MARQUETTE 18-21 14 -0.058 84.40 22.29 22.20 0.20 15.35 3.00 25.80 0.011 -0.001 22.0 304 PR10 MIDDLE POWDER 18-25 31 0.254 16.74 23.02 23.00 0.10 19.14 5.00 27.70 -0.029 0.001 22.7 336 RH05 NEW FORK LAKE 18-21 13 0.732 0.44 25.79 25.60 0.60 15.09 7.50 22.30 -0.243 0.016 25.5 342 PR10 NORTH FRENCH CREEK 18-20 8 -0.830 1.07 47.06 47.00 0.10 10.68 5.10 18.00 0.073 -0.007 46.5 345 PR10 NOWOOO 18-28 39 -0.615 <.01 11.79 11.70 0.20 12.99 1.70 24.60 0.058 -0.005 11.60 348 RH10 OLO BATTLE 20-28 35 -0.566 0.03 63.68 63.50 0.40 10.09 2.70 15.40 0.116 -0.011 62.8 349 PR10 OWL CREEK 18-25 30 -0.586 0.06 16.10 15.90 0.30 13.25 2.30 27.10 0.075 -0.006 15.80 375 PR10 PARKER PEAK 18-28 44 -0.455 0.19 28.59 -5.30 37.70 10.23 -0.40 21.60 11.272 -1.102 28.2 361 PR10 POWDER RIVER PASS 18-25 32 0.029 87.58 23.90 23.90 0.10 8.34 -1.10 20.60 0.002 0.002 23.5 387 RH05 RENO HILL 21-28 26 0.926 <.01 31.91 31.50 1.00 14.05 4.40 19.90 -0.780 0.056 31.55	9 1	RH10 LAPRELE CREEK	22-28	21	-0.075	74.50	28,00	27.70	0.90	11.60	0.20	23.20	0.029	-0.002	27.62,	28.38*
272 PR10 LITTLE WARM 23-25 10 -0.557 9.43 28.12 28.10 0.10 11.89 3.90 16.20 0.040 -0.003 27.70 283 PR10 LOST CREEK 26-28 9 -0.646 6.00 23.06 23.00 0.10 14.69 7.50 14.20 0.087 -0.006 22.8 297 PR10 MARQUETTE 18-21 14 -0.058 84.40 22.29 22.20 0.20 15.35 3.00 25.80 0.011 -0.001 22.0 304 PR10 MIDDLE POWDER 18-25 31 0.254 16.74 23.02 23.00 0.10 19.14 5.00 27.70 -0.029 0.001 22.7 336 RH05 NEW FORK LAKE 18-21 13 0.732 0.44 25.79 25.60 0.60 15.09 7.50 22.30 -0.243 0.016 25.5 342 PR10 NORTH FRENCH CREEK 18-20 8 -0.830 1.07 47.06 47.00 0.10 10.68 5.10 18.00 0.073 -0.007 46.5 345 PR10 NOWOOO 18-28 39 -0.615 <.01 11.79 11.70 0.20 12.99 1.70 24.60 0.058 -0.005 11.60 348 RH10 OLO BATTLE 20-28 35 -0.566 0.03 63.68 63.50 0.40 10.09 2.70 15.40 0.116 -0.011 62.8 349 PR10 OWL CREEK 18-25 30 -0.586 0.06 16.10 15.90 0.30 13.25 2.30 27.10 0.075 -0.006 15.80 375 PR10 PARKER PEAK 18-28 44 -0.455 0.19 28.59 -5.30 37.70 10.23 -0.40 21.60 11.272 -1.102 28.2 361 PR10 POWDER RIVER PASS 18-25 32 0.029 87.58 23.90 23.90 0.10 8.34 -1.10 20.60 0.002 0.002 23.5 387 RH05 RENO HILL 21-28 26 0.926 <.01 31.91 31.50 1.00 14.05 4.40 19.90 -0.780 0.056 31.55	4 1	RH10 LEWIS LAKE DIVIDE	18-21	13	0.830	0.04	64 22	64 00	0.50	17 10	9 10	19 00	-0.310	0.018	63.56	64.88
283 PR10 LOST CREEK 26-28 9 -0.646 6.00 23.06 23.00 0.10 14.69 7.50 14.20 0.087 -0.006 22.8 297 PR10 MARQUETTE 18-21 14 -0.058 84.40 22.29 22.20 0.20 15.35 3.00 25.80 0.011 -0.001 22.0 304 PR10 MIDDLE POWDER 18-25 31 0.254 16.74 23.02 23.00 0.10 19.14 5.00 27.70 -0.029 0.001 22.7 336 RH05 NEW FORK LAKE 18-21 13 0.732 0.44 25.79 25.60 0.60 15.09 7.50 22.30 -0.243 0.016 25.5 342 PR10 NORTH FRENCH CREEK 18-20 8 -0.830 1.07 47.06 47.00 0.10 10.68 5.10 18.00 0.073 -0.007 46.5 345 PR10 NOWOOD 18-28 39 -0.615 <.01 11.79 11.70 0.20 12.99 1.70 24.60 0.058 -0.005 11.64 349 PR10 OHL CREEK 18-25 30 -0.566 0.03 63.68 63.50 0.40 10.09 2.70 15.40 0.116 -0.011 62.8 349 PR10 OHL CREEK 18-25 30 -0.586 0.06 16.10 15.90 0.30 13.25 2.30 27.10 0.075 -0.006 15.80 375 PR10 PARKER PEAK 18-28 44 -0.455 0.19 28.59 -5.30 37.70 10.23 -0.40 21.60 11.272 -1.102 28.2 361 PR10 PHILLIPS BENCH 18-20 11 -0.173 61.09 51.98 51.90 0.30 15.13 4.80 22.10 0.039 -0.002 51.30 375 PR10 POWDER RIVER PASS 18-25 32 0.029 87.58 23.90 23.90 0.10 8.34 -1.10 20.60 0.002 0.002 33.5 387 RH05 RENO HILL 21-28 26 0.926 <.01 31.91 31.50 1.00 14.05 4.40 19.90 -0.780 0.056 31.50														-		
297 PR10 MARQUETTE 18-21 14 -0.058 84.40 22.29 22.20 0.20 15.35 3.00 25.80 0.011 -0.001 22.0 304 PR10 MIDDLE POWDER 18-25 31 0.254 16.74 23.02 23.00 0.10 19.14 5.00 27.70 -0.029 0.001 22.7 336 RH05 NEW FORK LAKE 18-21 13 0.732 0.44 25.79 25.60 0.60 15.09 7.50 22.30 -0.243 0.016 25.5 342 PR10 NORTH FRENCH CREEK 18-20 8 -0.830 1.07 47.06 47.00 0.10 10.68 5.10 18.00 0.073 -0.007 46.5 345 PR10 NOWOOO 18-28 39 -0.615 <.01 11.79 11.70 0.20 12.99 1.70 24.60 0.058 -0.005 11.66 348 RH10 OLO BATTLE 20-28 35 -0.566 0.03 63.68 63.50 0.40 10.09 2.70 15.40 0.116 -0.011 62.8 349 PR10 OWL CREEK 18-25 30 -0.586 0.06 16.10 15.90 0.30 13.25 2.30 27.10 0.075 -0.006 15.80 356 PR10 PARKER PEAK 18-28 44 -0.455 0.19 28.59 -5.30 37.70 10.23 -0.40 21.60 11.272 -1.102 28.2 361 PR10 PHILLIPS BENCH 18-20 11 -0.173 61.09 51.98 51.90 0.30 15.13 4.80 22.10 0.039 -0.002 51.30 375 PR10 POWDER RIVER PASS 18-25 32 0.029 87.58 23.90 23.90 0.10 8.34 -1.10 20.60 0.002 0.000 23.5 387 RH05 RENO HILL 21-28 26 0.926 <.01 31.91 31.50 1.00 14.05 4.40 19.90 -0.780 0.056 31.50																
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387 RH05 RENO HILL 21-28 26 0.926 <.01 31.91 31.50 1.00 14.05 4.40 19.90 -0.780 0.056 31.50													•			
400 PRIO SALI RIVER SUMMII 21-28 25 0.188 04.00 04.00 0.10 11.00 0.00 17./0 -0.012 0.001 05.50								-								
	U	PRIO SALI RIVER SUMMIT	21-28	25	0.188	20.80	24,00	22,90	0,10	11.00	اد.د	17.70	-0.012	0.001	و٥ ر و ر ر	J4.42

[.] INDICATES THAT ONE OR MORE MEASURED PRECIPITATION DATA VALUES FELL DUTSIDE THE SPECIFICATION ERROR BAND.

TABLE 34. REVISEO PRECIPITATION-TEMPERATURE 1986 FLUTTER STUDY STATISTICS FOR SNOTEL SITES IN WYOMING (CONTINUED).

		AUGUS	г	P/T CORRE-	RANDOM	FOR		RECIP				CORRI EQU	RATURE ECTION ATION		ICATION
	SENSOR SNOTEL TYPE STATION NAME	1986 OATE	NO8 S	LATION (R)	PROB (PCT)	A VE	(INCHES MIN) OELTA	AVE	EGREES MIN	C) OELTA	(c = a	a + bT) b	ERROR LOW	BANO HIGH
401	RH10 SANO LAKE	24-28	20	0.350	13.01	45.00	44.90	0.20	9.06	0.00	19.30	-0.027	0.003		
402	RH10 SANOSTONE RS	21-28	33	-0.756	<.01	30.53	30.30	0.40	13.95	5.30	17.10	0.231	-0.017	30.17,	30.89
419	PR 10 SHELL CREEK	22-28	25	-0.183	38.00	25.41	25.40	0.10	4.59	-4.60	19,20	0.002	-0.001	25.02,	25.80
432	RH10 SNIOER BASIN	21-26	22	0.849	<.01	31.33	30.90	0.80	14.18	1.40	21.50	-0.454	0.032	30,92,	31.74*
436	PR 10 SOUTH BRUSH CREEK	18-20	12	0.329	29,67	28.04	28.00	0.10	14.21	5,10	22,20	-0.034	0.003	27.71,	28.37
438	PR10 SOUTH PASS	21-24	14	-0.378	18,28	45.07	45.00	0.20	11.79	3.70	16,20	0.047	-0.004	44.52,	45.62
442	PRIO SPRING CREEK OLVIOE	21-25	19	0.252	29.73	50.19	50.00	0.20	12.45	5.20	13,20	-0.034	0.003	49.60,	50.78
446	PR10 ST. LAWRENCE	18-24	26	0.211	30.16	27.10	27.10	0.10	13.10	2.00	28,40	-0.003	0.001	26.75,	27.45
447	PR 10 ST. LAWRENCE ALT	18-20	10	-0.409	24.00	20.91	20.90	0.10	17.82	8,40	21.10	0.029	-0.002	20.69,	21.13
458	PR10 SUCKER CREEK	18-28	46	0.389	0.75	27.13	27.10	0.20	11.90	0.00	24.10	-0.043	0.003	26.76,	27.50
466	PR 10 SYLVAN LAKE	21-25	16	-0.700	0.25	40.16	40.10	0.10	8.80	-1.90	22.20	0.043	-0.005	39.59,	40.73
475	RH10 TOGWOTEE PASS	18-21	13	0.553	4.99	43,17	43.10	0.10	11.69	3,60	18,60	-0.054	0.005	42.64,	43.70
479	PR 10 TOWNSENO CREEK	18-20	10	-0.365	29.91	27.43	27.30	0.20	16.34	4.70	23.70	0.043	-0.003	27.10,	27.76
483	RHIO TRIPLE PEAK	24-28	17	0.929	<.01	51,29	50.90	1.00	11.77	2.80	19.40	-0.702	0.059	50.64,	51.94
485	PR10 TROUT CK	22 - 26	16	0.717	0.17	24.72	24.70	0.10	11.39	4.10	19.80	-0.055	0.005	24.42,	25.02
490	RH15 TWO OCEAN PLATEAU	18-28	41	-0.814	<.01	45.21	27.20	29.90	10.40	-0.50	23,40	10.410	-1.001	44.59,	45.83*
504	PR10 WARREN PEAK	18-28	44	-0.664	<.01	24.58	24.50	0.10	15.77	6.10	24.20	0.062	-0.004	24.30,	24.86
505	RH10 WEBBER SPRINGS	18-24	20	0.912	<.01	39.14	28.30	16.90	0.04	-18.30	44.30	-0.017	0.338	38.35,	39.93*
519	RH10 WILLOW CREEK	25 - 28	15	0.114	68,50	62,65	62,60	0.10	15.89	9.50	13.40	-0.024	0.001	62.01,	63.29
522	RHO5 WINOY PEAK	18-28	42	0.867	<.01	24.36	24.00	0.90	15.89	3.60	30.00	-0.553	0.035	24.06,	24.66*
525	PR10 WOLVERINE	23-28	21	0,610	0.33	29,20	28.60	1.40	12.42	2.00	22.20	-0.441	0.035	28.82,	29.58*
528	PR10 YOUNTS PEAK	18-28	31	-0.185	31.92	34.07	33.50	1.30	10.19	0.50	24.90	0.138	-0.013	33.61,	34.53*

^{*} INDICATES THAT ONE OR MORE MEASURED PRECIPITATION DATA VALUES FELL DUTSIDE THE SPECIFICATION ERROR BAND.

The error band shown in the 1986 annual report was based on a temperature adjustment for the deviation of the mean temperature from 75 degrees F. This resulted in a narrower band than the actual specifications allowed. The recalculated error band was based on the maximum of the absolute deviation of the minimum or maximum temperature from 75 degrees F. This change in defining the error band resulted in reducing the number of stations failing to meet specfications from 203 (39%) to 148 (29%) of the 517 SNOTEL sites used in the 1986 flutter study.

The effectiveness of applying the correction equation to a site exhibiting a high temperature dependency was tested using the Moores Creek Summit raw SNOTEL data for the 1986 water year. Applying the correction equation to the raw data does attenuate the diurnal temperature effect, but does not eliminate it. The resulting corrected accumulated precipitation time series is not monotonic and remains inconsistent. However, it is much less so than the raw data series. This can be seen in figure 24.

Further refinement of the temperature correction equation was attempted by selecting additional rain-free periods from the 1986 water year raw data file. This produced four additional equations which, with the flutter study equation, make a total of five correction equations for the Moores Creek site. They are summarized as follows:

1. The 1986 flutter study equation derived from the 6 day period, 8/18/86 to 8/24/86 of 24 observations. (Correction equation in the Annual Report.)

```
C_1 = -0.905 + 0.053 T

r = +0.857 RSQ = 0.734

PAVE = 55.59 inches Range = [55.0, 56.5] Delta = 1.5 inches

TAVE = 17.15 deg C. Range = [6.7, 31.0] Delta = 24.3 deg C.
```

2. Equation derived from the raw data series for the 40 day period, 6/13/86 to 7/23/86, consisting of 72 observations.

```
C_2 = -1.460 + 0.104 \text{ T}

r = +0.931 RSQ = 0.867

PAVE = 54.72 inches Range = [53.2, 56.3] Delta = 3.1 inches

TAVE = 14.09 deg C. Range = [-0.6, 29.2] Delta = 29.8 deg C.
```

3. Equation derived from the raw data series for the 30 day period, 7/26/86 to 8/24/86, consisting of 33 observations.

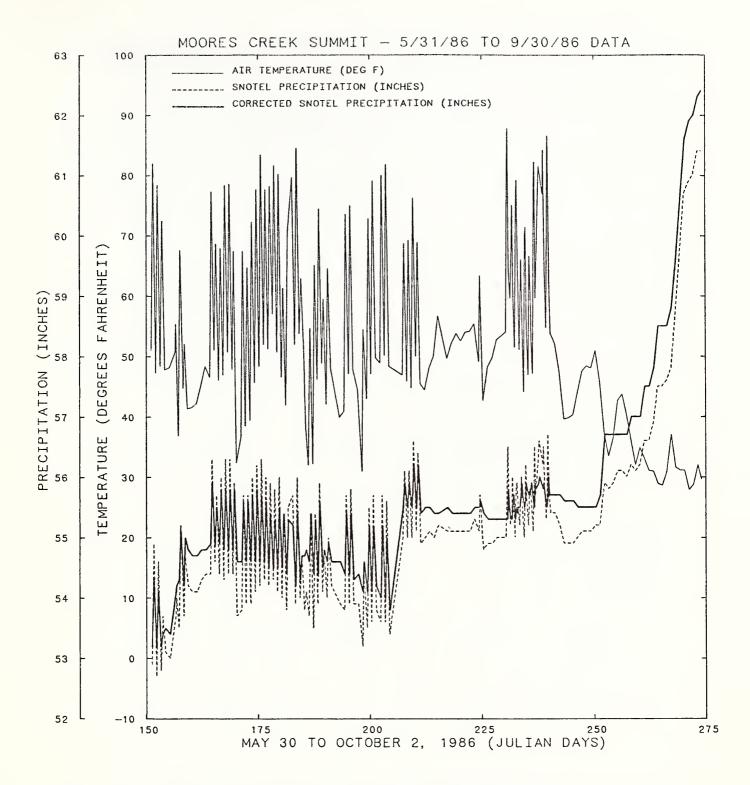


Figure 24. SNOTEL air temperature, precipitation, and precipitation corrected by equation C1 for the Moores Creek Summit during the time period from May 31 to September 30, 1986.

4. Equation derived from the raw data series for the 30 day period, 7/26/86 to 8/24/86, augmented by the flutter study data making a total of 50 observations.

5. Equation derived from the raw data series for the 43 day period, 7/26/86 to 9/8/86, augmented by the flutter study data making a total of 64 observations.

Table 35 provides a comparison of values obtained by applying the five different correction equations to the raw precipitation measurements. It is the air temperature at the SNOTEL site in degrees Celsius, P is the raw SNOTEL precipitation reading, P_{ED} is the precipitation value from the edited Moores Creek data file obtained from the SCS.

Table 35. Comparison of SNOTEL precipitation as corrected by equations C1 through C5.

		ACCU	MULATED	PRECIPIT	ATION		
T	P	P _{C1}	P _{C2}	P _{C3}	P _{C4}	P_{C5}	P_{EE}
2.2	0.1	0.9	1.3	0.9	0.9	0.8	0.0
8.5	52.7	53.2	53.3	53.0	53.1	53.0	52.9
4.3	54.9	55.6	55.9	55.6	55.6	55.4	55.4
-1.3	61.4	62.4	63.0	62.4	62.5	62.3	61.4
		PRECI	PITATION	DURING	PERIOD		
OD	P	P _{C1}	P _{C2}	P _C 3	P _{C4}	P _{C5}	P_{ED}
9/30/86	61.3	61.5	61.7	61.5	61.6	61.5	61.4
6/01/86	52.6	52.3	52.0	52.1	52.2	52.2	52.9
9/01/86	2.2	2.4	2.6	2.6	2.5	2.4	2.5
9/30/86	6.5	6.8	7 1	6.8	6.9	6.9	6.0
	2.2 8.5 4.3 -1.3 OD 9/30/86 6/01/86 9/01/86	2.2 0.1 8.5 52.7 4.3 54.9 -1.3 61.4 OD P 9/30/86 61.3 6/01/86 52.6 9/01/86 2.2	T P PC1 2.2 0.1 0.9 8.5 52.7 53.2 4.3 54.9 55.6 -1.3 61.4 62.4 PRECI 9/30/86 61.3 61.5 6/01/86 52.6 52.3 9/01/86 2.2 2.4	T P PC1 PC2 2.2 0.1 0.9 1.3 8.5 52.7 53.2 53.3 4.3 54.9 55.6 55.9 -1.3 61.4 62.4 63.0 PRECIPITATION PC1 PC2 9/30/86 61.3 61.5 61.7 6/01/86 52.6 52.3 52.0 9/01/86 2.2 2.4 2.6	T P P _{C1} P _{C2} P _{C3} 2.2 0.1 0.9 1.3 0.9 8.5 52.7 53.2 53.3 53.0 4.3 54.9 55.6 55.9 55.6 -1.3 61.4 62.4 63.0 62.4 PRECIPITATION DURING P _{C1} P _{C2} P _{C3} 9/30/86 61.3 61.5 61.7 61.5 6/01/86 52.6 52.3 52.0 52.1 9/01/86 2.2 2.4 2.6 2.6	2.2 0.1 0.9 1.3 0.9 0.9 8.5 52.7 53.2 53.3 53.0 53.1 4.3 54.9 55.6 55.9 55.6 55.6 -1.3 61.4 62.4 63.0 62.4 62.5 PRECIPITATION DURING PERIOD OD P PC1 PC2 PC3 PC4 9/30/86 61.3 61.5 61.7 61.5 61.6 6/01/86 52.6 52.3 52.0 52.1 52.2 9/01/86 2.2 2.4 2.6 2.6 2.5	T P P_{C1} P_{C2} P_{C3} P_{C4} P_{C5} 2.2 0.1 0.9 1.3 0.9 0.9 0.8 8.5 52.7 53.2 53.3 53.0 53.1 53.0 4.3 54.9 55.6 55.9 55.6 55.6 55.4 -1.3 61.4 62.4 63.0 62.4 62.5 62.3 PRECIPITATION DURING PERIOD P P_{C1} P_{C2} P_{C3} P_{C4} P_{C5} 9/30/86 61.3 61.5 61.7 61.5 61.6 61.5 6/01/86 52.6 52.3 52.0 52.1 52.2 52.2 9/01/86 2.2 2.4 2.6 2.6 2.5 2.4

The precipitation temperature correlation was positive for all of the five Moores Creek data sets and each equation produced a corrected time series similar to that shown in the Figure 24. Although the number 2 equation derived from the 40 day period with 72 observations produced the largest corrections and highest correlation, the first equation is nearly as effective. In addition, since the first equation was derived from a data set that represented the diurnal temperature pattern best, it remains the equation of choice.

Assessment of the 1986 results may be summarized as follows:

- The transducer selection and installation procedures used by the various states need to be reviewed. This may help to explain why only four percent of the Montana sites failed the transducer specifications as contrasted with 42 percent in Oregon and an overall failure rate of 29 percent.
- 2. There was a highly significant precipitation temperature dependency at 58 percent of the 517 sites. Fifty percent of these showed a positive correlation and fifty percent were negatively correlated. Thermal expansion of the gaging system materials may explain some of the negative cases as noted in Section A, but the positive cases point to the transducers.
- 3. The correction equations derived from the regression analysis may remove some of the temperature dependency, but will still leave some inconsistency in the measured precipitation time series. How well they perform and their suitability for application can only be assessed after the causes of the anomalous behavior of the precipitation measurements have been firmly established.
- 4. The transducer specifications allow such a broad tolerance, greater than 1.0 inches of water, that these transducers may not be capable of providing measurements of the accuracy needed for some of the desired applications.

The flutter study was continued into 1987 by polling the sites from June 1 to June 10. Precipitation was quite widespread over the area during the last five days of the polling so all of the data for all of the sites had to be plotted and examined in order to select an appropriate rain-free period for the analysis. In general, this caused the analysis to be limited to only the first five days of the polling period. A summary of these analyses is included as Tables 36 through 45.

Several sites from each state were selected for transducer replacement after which another poll was made in order to isolate the transducer effects from other site effects. Table 46 shows which sites were selected as candidates for transducer replacement. The criteria used for making this selection were the correlation between precipitation and temperature, the precipitation range (delta) shown during the poll, and the probability of the relationship being non-significant.

The summary table for the poll conducted in October, 1987, following the replacement of some of the transducers is included as Table 47.

TABLE 36. PRECIPITATION-TEMPERATURE 1987 FLUTTER STUDY STATISTICS FOR SNOTEL SITES IN ARIZONA.

													TEMPER	ATURE		
					P/T		RANG	E OF RE	ADINGS				CORRE	CTION		
			JUNE		CORRE-	RANDOM	FOR	ZERO P	RECIP	TEMPE	RATURE	RANGE	EQUA	TION	SPECIF	ICATION
SITE	SENSO	R SNOTEL	1987		LATION	PROB		(INCHES)	(0	EGREES	C)	(c = a	+ bT)	ERROR	BANO
NO	TYPE	STATION NAME	OATE	NOBS	(R)	(PCT)	AVE	MIN	OELTA	AVE	MIN	OELTA	а	ь	LOW	HIGH
9	RH10	BAKER BUTTE	1- 3	16	0.749	0.08	24.78	24.60	0.40	21.84	9.70	21.50	-0.391	0.018	24.53,	25.03
11	PR 10	BALOY	1-3	13	0.236	43.71	20.34	2.10	21.40	10.11	-0.30	19.00	-2.284	0.226	20.06,	20.62*
71	RH05	BUCK SPRING	1- 3	14	0.116	69.21	23,36	23.30	0.20	11.82	-2.30	30.40	-0.004	0.001	23.02,	23.70
114	RH10	CORONAGO TRAIL	1- 3	1.1	0.963	<.01	21.59	21.20	0.70	13.12	-0.10	26.00	-0.340	0.026	21.30,	21.88*
181	RH10	FRISCO DIVIDE	1- 3	7	-0.927	0.26	14.67	14.50	0.50	16.06	6.40	18.70	0.338	-0 _• 021	14.50,	14.84*
183	RH05	FRY	1- 3	14	-0.895	<.01	17.75	17.40	0.70	19.46	2.70	27.90	0.415	-0.021	17,53,	17.97*
206	PR 10	HANNAGAN MEAOOWS	1- 3	13	0.216	47.87	22,45	22.40	0.10	12.97	-0.50	22.70	-0.017	0.002	22.14,	22.76
212	RH05	HEBER	1-3	14	-0.010	97.12	21.09	21.00	0.20	17.27	7.80	20.50	0.005	0.000	20.86,	21.32
286	RH10	LOOKOUT MOUNTAIN	1-3	13	0.401	17.42	13.87	13.60	1.90	19.34	7.90	23,60	-0.500	0.026	13.72,	14.02*
303	PR10	MAVERICK FORK	1- 3	13	0.237	43.61	23.13	23.00	0.20	10.65	-2.30	21.20	-0.019	0.002	22.80,	23.46
322	RH05	MORMON MOUNTAIN	1- 3	9	0.059	88.02	14.04	-30.30	49.90	14.71	5.10	19.30	-2.208	0.150	13.87,	14.21*
383	RH10	PROMONTORY	1-3	12	0.688	1.34	22.77	14.80	12.10	12.63	6.90	10.70	-13.071	1.035	22.52,	23.02*
430	RH10	SIGNAL PEAK	1- 3	13	0.453	12.03	20.12	19.90	0.50	16,62	7.90	18,40	-0.201	0.012	19.90,	20.34*
432	RHIO	SILVER CREEK OIVIOE	1- 3	11	0.135	69.16	26.76	26.70	0.20	13.31	4.90	15.50	-0.019	0.002	26.44,	27.08
470	RHIO	SUGAR LOAF	1- 3	13	-0.926	<.01	15.45	15.20	0.60	19.78	4.20	27.00	0.464	-0.024	15.26,	15.64*
525	RH05	WHITE HORSE LAKE	1- 3	13	0.354	23,55	-32.48	-32.50	0.10	17.56	5.30	23.70	-0.029	0.002	-32.10,	-32.86*
530	RH05	WILDCAT	1- 3	12	0.047	88.49	23.14	23.00	0.20	13.40	1.20	20.50	-0.003	0.000	22.84,	23.44
540		WORKMAN	1- 3	9	-0.900	0.09	24.31	24.00	0.60	18.26	8.20	19.70	0.469	-0.026	24.05,	24.57*

^{*} INDICATES THAT ONE OR MORE MEASURED PRECIPITATION DATA VALUES FELL OUTSIDE THE SPECIFICATION ERROR BAND.

TABLE 37. PRECIPITATION-TEMPERATURE 1987 FLUTTER STUDY STATISTICS FOR SNOTEL SITES IN COLORADO.

			JUNE		P/T CORRE-	RANDOM		SE OF RE		TEMPE	RATURE	RANGE	CORR	RATURE ECTION ATION	SPEC IF	ICAT I
NO	SENSOF TYPE	STATION NAME	1987 OATE	NOBS	LATION (R)	PROB (PCT)	AVE	(INCHES	OELTA	AVE	EGREES MIN	C) OELTA	(c = .	a + bT) b	ERROR LOW	BANO HIGH
3	RH05	APISHAPA	2- 5		0.302	27.44		18.70		10.40	2,20	18,30	-3.000	0.288	20.17,	20.6
	PR10				-0.394	6.95	15.84	15.80	0,10	10,83	1.00	19,60	0.036	-0.004	15.63,	16.0
		BATEMAN			-0.363	11.58		19.90	0.30	9.96	2.40	17.40	0.046	-0.005	19.81,	20.3
22		BEAR LAKE	3- 5		0.930	0.02		21,90	0.40	14.47	1.20			0.018	21.88,	
27	RH10	BEARTOWN	1- 5	22	0.735	<.01	32.79	32.40	0.80	4.36	-4.20	18.30	-0.149	0.034	32,29,	33.2
		BERTHOUO SUMMIT	1- 5		-0.415	4.88		23,50	0.10		-6.00		0.017	-0.004	23,17,	
46		BISON LAKE	1- 5		0.908	<.01		25.80	0.40				-0.159		25.62,	
		BRUMLEY	1- 5		0.361	12.89		15.40	0.20				-0.018	0.002	15,28,	
77		BURRO MOUNTAIN	1- 5		0.316	14.25		24.40	0.20				-0.024		24.11,	
79	RH10	BUILE	1- 5	21	0.976	<.01	17.69	17.40	0,60	10.54	1.10	19,30	-0,356	0.033	17.46,	17.9
84		CASCAOE	1- 5		0.721	0.01		28.10	0.10	12.51			-0.056	0.004	27.80,	
		CATHEORAL BLUFFS	1- 5		0.606	0.27		19.50	0.30	13,01			-0.138	0.011	19.43,	
		CHAMITA	1- 5		0.983	<.01		18.10	0.10	10,63	1.40		-0.059		17.91,	
		COLUMBINE	1- 5		0.973	<.01		22,20	1,20	12.81			-0.545		22.49,	
107		COLUMBINE PASS	1- 5	25	0.862	<,01	27,28	26,80	0.80	12.57	0,20	23,30	- 0,438	0,035	26,91,	27.0
10	RH05	COPELANO LAKE	1- 5	16	-0.739	0.10	19.92	19.80	0.20	14.45	-0.70	28,50	0.075	-0.005	19.64,	20.
113	RH05	COPPER MOUNTAIN	1- 5	23	-0.312	14.71	15.57	15.50	0.20	7.71	-3.50	21.00	0.018	-0.002	15.34,	15.
127	PR10	CULEBRA #2	1- 5	19	0,408	8,26	23,38	23,20	0.20	9.10	-2.90	22.00	-0.024	0.003	23,04,	23.
128	RH 10	CUMBRES TRESTLE	1- 5	20	0.789	<.01	27,64	27.40	0.40	10.26	0,60	19.10	-0.154	0.015	27.27,	28.
135	PR10	OEADMAN HILL	1- 5	20	0.000	100.00	17.70	17.70	0.00	6.16	-2.70	20.10	0.000	0.000	17.44,	17.
152	RH10	ORY LAKE	1- 5	22	-0.873	<.01	23,79	23,70	0.30	10,69	-2.50	26,20	0,125	-0.012	23.44,	24.
160		EL DIENTE PEAK	1- 5	22	0.695	0.03	29,12	29.00	0.30	8.46	-3.00	21.50	-0.070	0.009	28,69,	
162	RH05	ELK RIVER	1- 5	22	0.875	<.01	17.24	16,90	0.80	10.47	-1.20	24.40	-0.375	0.036	17.00,	17.
180	RH10	FREMONT PASS	1- 5	22	0.805	<.01	16.54	16.30	0.50	3,60	-5.30	18.80	-0.082	0.022	16.28,	16.
186	PR 10	GALLEGOS PEAK	1- 5	23	-0.510	1.30	20,86	20,20	0.90	9.16	0.40	19,10	0.143	-0.016	20.58,	21.
199	RH10	GRIZZLY PEAK	1- 5	17	0,966	<,01	18.18	17.90	0.50	8.95	-2.60	19.70	-0,255	0.028	17,92,	18.
203		HAGERMAN TUNNEL	1- 5	23	0.936	<.01	31.97	31.80	0.40	6.47	-3.30	20.20	-0.127	0.019	31.50,	32.
224	RH10	HOOS IER PASS	1- 5	23	-0.235	27.98	22.10	22.00	0.20	6.73	-3. 30	18,90	0.019	-0.003	21,77,	22.
225	RH10	HOPEWELL	1- 5	21	0.000	100.00	9.70	-8.30	32.10	6.33	-2.00	16,60	-0.008	0.000	9.56,	9.
231	RH10	10ARADO	1- 5	17	0.832	<.01	24.09	24.00	0.20	10.42	-2.40	22,20	-0.084	0.008	23.74,	24.
235	RH10	INDEPENDENCE PASS	1- 5	21	0.945	<.01	20.41	20.20	0.40	6.07	-5.50	23.20	-0.105	0.017	20.09,	20.
	RH10	JOE WRIGHT	1- 5		-0.502	2.04	24.71		0.20	-	-8.10	-	0.019	-0.008	24.30,	25.
	RH05		1- 5		-0.819	<.01	15.20	15,00	0.40		-4.00	-	0.107	-0.010	14.97,	
		LAKE ELOORA	1- 5		-0.045	85.90	19.32	10.80	11.70	13.14	1.30	27.10	0.448	-0.034	19.07,	
258	PR 10	LAKE IRENE	1- 5	21	0.141	54.07	21.05	21,00	0.10	6,59	- 3,00	20.00	-0,005	0.001	20,74,	21.
		LILY PONO	1- 5		0,929	<.01		25,60	0.80	9.78			-0.366		25.70,	
		LIZARO HEAO PASS			0.834	<.01		24.60	0.20				-0.049		24.36,	
		LONE CONE	1- 5		0.186	42.01		26.30	0.60				-0.051		26,12,	
295 304		LYNX PASS MC CLURE PASS	1- 5		-0.684 0.911	0.06 <.01		13,90 21,00	0.60 0.90	10.15			0.143 -0.616		13.96, 21.30,	
		MIOOLE CREEK	1- 5		0.866	<.01		34.90	0.70				-0.171		34.72,	
		MINERAL CREEK	1- 5		0.782	<.01		23.10	7.70				-2.527		24.43,	
315		MOLAS LAKE		23	0.558	0.56		24.20	0.20	9.05			-0.046		23,93,	
338 339	RH05	NAST LAKE NAVAL OILSHALE	1- 5 1- 5	22	0.973 -0.144	<.01 52.23		13.10 16.00	0.70 0.20	11.54 12.25			-0.277 0.018		13,29, 15,88,	
	RH05		1- 5		0.653	0.44		24.00	0.50				-0.099		23,90,	
	PR 10	NORTH COSTILLA	1- 5		0.123	64,91		-4.50					-0.839		6.31,	
349	DUCE	NORTH LOST TRAIL	1- 5		0.761	<.01		22.20	0.80	11.04			-0.327	-	22,17,	-
		PANCHUELA	1- 5		0.429	5,87		17.90	0.50				-0.082		17.90,	
		PARK CONE		17	0.935	<.01		16.50	0.80				-0.317	0.008		

^{*} INDICATES THAT ONE OR MORE MEASURED PRECIPITATION DATA VALUES FELL OUTSIDE THE SPECIFICATION ERROR BAND.

TABLE 37. PRECIPITATION-TEMPERATURE 1987 FLUTTER STUDY STATISTICS FOR SNOTEL SITES IN COLORADO (CONTINUEO).

			JUNE		P/T CORRE-	RANDOM		E OF RE		TEMPE	RATURE	DANCE		RATURE ECT 10N	SPEC IF	ICAT ION
SITE	SENSO	R SNOTEL	1987		LATION	PR0B	101	(INCHES			EGREES		,	a + bT)	ERROR	
	TYPE	STATION NAME	OATE	NOBS	(R)	(PCT)	AVE	MIN	OELTA	AVE		OELTA	a	ь ь	LOW	HIGH
		PARK RESERVOIR	1- 5	24	0,603	0.17	30, 50	30,20	0,50	5, 88	-6.20	21.10	-0.071	0.011	30,02,	30.98
366		PHANTOM VALLEY	1- 5		0.791	<.01	-	13.90	0.40				-0.108		13,89.	
379	PR 10	PORPHYRY CREEK	1- 5	21	-0,130	57.30	-	22,50	0.10				0.010	-	22,20,	-
386	RH05		1- 5		0.599	0.41	-	20,20	4.00	-	-	-	-2,213	-	21.66,	
391	RH10	REO MOUNTAIN PASS	1- 5	23	0.970	<.01	-	-17.80	-				-0.774		26.18,	
393	RH05	REO RIVER PASS #2	1- 5	20	-0.327	15,97	15,82	15.70	0.50	11.09	2,10	17,80	0.075	-0.007	15,62.	16_02*
396	RH10	ROACH	1- 5	16	0.777	0.04	-	19,40	0.30	-			-0.069	-	19,25,	-
415		SCHOFIELD PASS	1- 5	23	0.007	97.64	-	31,90	0.20	-	-	-	-0.001	0.000	31,57.	
417		SCOTCH CREEK	1~ 5	22	0.746	<.01	-	26,90	0.50	10.01	-	-	-0. 135	0.014	26.76.	
421	RH05	SENORITA OIVIOE	1- 5	15	0.033	90,66	9.27	-12.70	33.90	10.35	0.60	17.60	-0.753		9,15,	
438	RH05	SLUMGULLION	1- 5	25	0.875	<.01	22.37	22.10	0.60	7.73	-3.10	19.70	-0.156	0.020	22.04,	22.70*
464		STILLWATER CREEK	1-5	21	0.881	<.01	9.80	9.60	0.50	11.41	-0.50	24.90	-0.213	0.019	9.66,	9.94
473	PR 10	SUMMIT RANCH	1- 5	23	-0.185	39.77	12.88	12.70	0.30	10.02	-3.00	25.10	0.032	-0.003	12,69,	13.07
489	RH10	TOWER	1-5	21	-0.357	11.21	19.24	-47.40	80.70	5.64	-3.30	17.00	11.507	-2.040	18.96,	19,52
491		TRAPPER LAKE	1- 5	21	0.669	0.09	21.38	21,20	0.40	9,64	-4.20	24.10	-0.078	0.008	21.06,	21.70
502	PR10	UNIVERSITY CAMP	1- 5	20	0.868	<.01	24.99	24.70	0.60	7.57	-2.20	21.10	-0.177	0.023	24.63,	25.35
504	PR 10	UPPER SAN JUAN	1- 5	20	0.000	100.00	39.90	39.90	0.00	8.30	-1.90	21.20	0.000	0.000	39.33,	40.47
506	RH10	VAIL MOUNTAIN	1- 5	20	0.895	<.01	22.75	22,50	0.50	9.93	-0.40	18.90	-0.306	0.031	22.44,	23.06
507		VALLEC ITO	1- 5	23	0.901	<.01	28,61	28,50	0.30	10.10	1.10	16.60	-0.183	0.018	28,23,	28,99
511	RH05	W FORK PARACHUTE	1- 5	22	-0.697	0.03	13.76	13.60	0.40	10.57	-3.50	25.70	0.094	-0.009	13,56,	13.96
521	RH05	WHISKEY CK	1- 5	16	0.895	<.01	28.12	27.80	0.70	10.15	-0.80	22.80	-0.237	0.024	27.73,	28.51
533	PR10	WILLOW CREEK PASS	1- 5	22	-0.244	27.29	14.70	14.60	0.20	7.56	-4.40	25,40	0.009	-0.002	14.48,	14.92
534	RH10	WILLOW PARK	1- 5	17	0.774	0.02	21.66	21.00	1.50	8.23	-1.70	20.20	-0.482	0.058	21.35,	21.97
537		WOLF CREEK SUMMIT	1- 5	22	0.752	<.01	40.88	40,60	0.60	8.87	0.50	15,60	-0.233	0.026	40.33,	41,43
544	RH10	Z COLO SHOP	1- 5	19	0.361	12.92	99,63	99,60	0.10	22.73	7.70	32.10	-0.043	0.002	98.55,	100.71
545	PR 10	Z COLO TEST	1- 5	20	0.000	100.00	100.00	100.00	0.00	-51.30	-51.30	0.00	0.000	0.000	96.79,	103.21

^{*} INDICATES THAT ONE OR MORE MEASURED PRECIPITATION DATA VALUES FELL DUTSIDE THE SPECIFICATION ERROR BAND.

TABLE 38. PRECIPITATION-TEMPERATURE 1987 FLUTTER STUDY STATISTICS FOR SNOTEL SITES IN 10AHO.

			JUNE		P/T	RANDOM		SE OF RE		TEMPE	RATURE	RANCE	CORRI	RATURE	cocour	ICATION
CITE	CENSO	R SNDTEL	1987		LATION	PR08	FUR							ATION		
NO	SENSO: TYPE	STATION NAME	OATE	NOBS		(PCT)	AVE		0ELTA	AVE		DELTA	a	a + bT) b	ERROR LOW	HIGH
6	RH15	ATLANTA SUMMIT	1- 5	19	-0.277	25.04	21.14	20.80	0.80	6.66	-6.30	26.30	0.061	-0.010	20.80,	21.48
		BANNER SUMMIT	1-5		0.910	<.01		22.40	1.40				-0.475		22.64,	
		BEAR BASIN	1-5		0.610	0.42		-5.20	-				-8.315		12.57,	
		BEAR CANYON BEAR MOUNTAIN	1- 5		-0.544 0.532	0.72 1.07		14.50 74.20	0.30 1.00		-5.00 -1.30		0.062 -0.142	-0.006 0.015	73.95,	
24	RH10	BEAR SADDLE	1- 5	20	-0.456	4.35	9.92	-10.30	30.00	11.75	-2.00	24.60	8,746	-0.745	9,78,	10.06
34	RH10	BENNETT MOUNTAIN	1- 5	20	0.618	0.37	14.12	13.20	2.10	14.76	0.00	25.70	-0.922	0.062	13.93,	14.31
39	RH10	BIG CREEK SUMMIT	1- 5	17	-0.605	1.01	27.60	26.80	1.10	10.37	-2.20	25.80	0.230	-0.022	27.20,	28.00
58		BOSTETTER R.S.	1- 5		0.747	0.01		12,20	1.50				-0.554		12.55,	
109	RH15	COOL CREEK	1- 5	16	0,773	0.04	47,58	47.30	0.50	9.54	-3,20	28.80	-0.112	0.012	46,88,	48.28
		CDZY COVE CRAB CREEK	1- 5 1- 5		0.485 0.474	2.58 4.05		-3.30 -4.50	20.90 19.20	10.68 14.04			-5.065 -6.613	0.474 0.471	12.38, 11.37,	
		CRATER MEADOWS	1- 5		-0.692	0.05		40.50	0.30		-3.70		0.083	-	40.02,	
136		OEADWOOD SUMMIT	1- 5		-0.791	0.02		30.90	0.80		-8.60		0.096		30.91,	
		DOLLARHIDE SUMMIT	1- 5		-0.388	10.10		21.00	0.40		-4.10		0.071		20.92,	
161	RH15	ELK BUTTE	1- 5	23	-0,902	<.01	37.54	37.20	0.80	11.70	-1.60	24,20	0.331	-0.028	37.01,	38.07
166		EMIGRANT SUMMIT	1- 5	20	0.592	0.59		17.60	3,60	•	•	-	-0,691	0.065	19.96,	20.54
184		GALENA	1- 5		0,695	0.06		13.00	1.40		-	-	-0.343		13.34,	
		GALENA SUMMIT	1- 5		-0.892	<.01		15.00	2.30		-5.30		0.702		15.88,	
187	RH05	GARFIELD R.S.	1- 5	18	0,889	<.01	11,49	11.20	0,60	10.39	-4.10	27,40	-0.252	0.025	11,32,	11.66
188	BAD	GIVEOUT	1- 5	21	-0.242	28.98	12.57	12.50	0.20	11.49	-0.90	23.30	0.023	-0.002	12.39,	12.75
192	RH10	GRAHAM GUARO STA.	1- 5	21	0.854	<.01	17.10	16,10	2.00	11.49	-5.00	31.20	-0.660		16.84,	
		HEMLOCK BUTTE	1- 5		0.851	<.01		42.00	0.90				-0.328		41.84,	
217		HILTS CREEK			-0.501	2.89		11.60	0.40		-4.00		0.073		11,61,	
227	RH10	HOWELL CANYDN	1- 5	23	-0.734	<.01	20.07	19.80	0.50	8.99	-2.80	21,80	0.123	-0.014	19.78,	20.36
228	RH10	HUMBOLDT GULCH	1- 5	18	0.747	0.03	35.24	35.10	0.20	10.94	-1.30	28.70	-0.067	0,006	34.74,	35.74
230	RH10	HYNDMAN	1- 5	18	0.638	0.43	14.64	14.40	0.40	11.32	-4.10	28,60	-0.088	0.008	14.42,	14.86
		ISLAND PARK	1- 5		-0.104	67.29	-	-2.70	32,10		-4.40	-	1.528	-0.128		6.91*
243		JACKSON PEAK	1- 5		0.352	11.72		23.90	0.30			-	-0.039		23.71,	
280	RH15	LOLO PASS	1- 5	21	-0,545	1,06	30,50	30.00	0.70	10,11	-3,30	31.50	0.106	-0.011	30.05,	30,95
285	RH10	LOOKDUT	1- 5	21	0.890	<.01	36.77	35.70	2.10	11.75	-0.40	27.50	-0.785	0.067	36.26,	37.28
289	RH20	LDST LAKE	1- 5	21	-0.185	42,20	53.81	53.20	1.20	0.84	-51.10	82.40	0.007	-0.003	52.09,	55.53
290		LOST	1- 5		0.069	76.72		17.90	57.10				-1.963	-	30.98,	-
		MAGIC MOUNTAIN	1- 5		0.631	0.21		18.60	0.50				-0.116		18.50,	
306	RH10	MEADOW LAKE	1- 5	20	0.868	<.01	20.73	20.50	0.50	7.29	-5.60	23.40	-0.114	0.016	20.41,	21.05
312	RH10	MILL CREEK SUMMIT			-0.695	0.06	17.44	17,10	0.60	8.09	-4.30	23.80	0.144	-0.018	17,18,	17.70
						4.80	11.56	11.40	0.30	10.10	-3.70	26.00	0.041	-0.004	11.39,	11.73
		MOORES CREEK SUMMIT			-	<.01		23.00	1.00				-0.388		23.16,	
		MOOSE CREEK			-0.883	<.01		14.70	0.40	-	-	-	0.123	_	14.72,	
321	RH10	MORGAN CREEK	1- 5	20	0,610	0.43	13,26	13,10	0.40	8,36	-5.40	27,10	-0.073	0.009	13,05,	13,47
					-0.858	<.01		43.70	1.40				0.520		43.82,	
		MOUNTAIN MEADOWS MUO FLAT	1-5		0.917 -0.750	<.01 0.01		26.00	0.90				-0.215 0.196	-0.013	25.98,	9.821
		OXFORD SPRING	1- 5		0.669	0.01	9,68	9.40 16.20	0.50 0.80				-0.361		16.38,	
		PRAIRIE			-0.905	<.01	9.39		1.50				0.624	-0.041		9.53
413	RH15	SAVAGE PASS	1-5	22	0.198	37.69	27.22	27.00	0.30	9.04	-3.90	29.30	-0.014	0.002	26.81,	27.63
		SCHWEITZER BASIN			0.560	1.01		44.90					-0.056		44.45,	
418	RH15	SECESH SUMMIT	1-5	20	0.639	0.24	18.06	-6.30	33,20	10.55	-3.90	28.60	-10.928	1.036	17.79,	18.33
			1- 5	24	-0.942	<.01	33.30	32.60	1.20	13.38			0.486		32.85,	
126	RHOS	SHEEP MTN.	1- 5	23	-0.442	3,46	8,61	-7.70	22.30	10.20	-4.20	30,60	4.973	-0.488	8.48,	8.74

^{*} INDICATES THAT DNE OR MORE MEASURED PRECIPITATION DATA VALUES FELL DUTSIDE THE SPECIFICATION ERROR BAND.

TABLE 38. PRECIPITATION-TEMPERATURE 1987 FLUTTER STUDY STATISTICS FOR SNOTEL SITES IN 10AHO (CONTINUED).

			JUNE		P/T CORRE-	RANDOM		E OF RE		TEMPE	RATURE	RANGE	CORRE	RATURE ECTION ATION	SPECIF	ICATION
SITE	SENSOF	R SNOTEL	1987		LATION	PR0B		(INCHES)	(0	EGREES	C)	(c = a	a + bT)	ERROR	BAN0
NO	TYPE	STATION NAME	OATE	NOBS	(R)	(PCT)	A VE	MIN	OELTA	A VE	MIN	OELTA	а	b	LOW	HIGH
428	RH10	SHERWIN	1- 5	24	-0.140	51.27	27,53	25.30	12.00	4,96	-13,80	43.30	0,152	-0.031	27.02,	28.04
437	RH10	SLUG CREEK OIVIOE	1- 5	20	0.085	72.16	17.21	17.20	0.10	10.35	-2.20	24.90	-0.008	0.000	16.96,	17.46
443	RH05	SOMSEN RANCH	1- 5	21	0.938	<.01	13.76	13.50	0.40	7.60	-3.90	21.90	-0.135	0.017	13,55,	13.97*
446	RH15	SOUTH MTN.	1-4	15	-0.720	0.24	6.14	-1.90	23,40	12.15	0.10	23,20	14.705	-1.210	6.06,	6.22*
454	RH10	SQUAW FLAT	1- 5	23	-0.637	0.10	23.45	23.10	0.50	10.22	-3.90	27.20	0.129	-0.013	23.10,	23.80
463	RH10	STICKNEY MILL	1- 5	19	-0.931	<.01	10.78	10,30	1.00	10.33	-4.40	26.80	0.370	-0.036	10,62,	10.94
474	RH 15	SUNSET	1-5	20	-0.938	<.01	38.42	37.40	1.70	10.78	-0.90	25.50	0.669	-0.063	37.88,	38.96*
176	RH20	SWEOE PEAK	1- 5	21	0.704	0.03	14.53	14.30	0.50	10.46	-3.10	26,60	-0.153	0.015	14.32,	14.74
493	RH15	TRINITY MTN.	1- 5	21	-0.995	<.01	15.79	-7.10	32.30	-32.68	-51.30	72.70	-15.824	-0.484	15.28,	16.30
509	RH15	VIENNA MINE	1- 5	21	0.866	<.01	24.25	23.90	1.00	8.47	-4.10	23,90	-0.356	0.042	23,88,	24.62
519	RH10	WEST BRANCH	1- 5	20	0.708	0.04	18.03	-4.30	29.90	13.06	-0.90	27.40	-14.735	1.128	17.78,	18.28
524	RH10	WHITE ELEPHANT	1- 5	19	0.030	90.41	9.11	-6.00	28,60	9.92	-3.70	26.10	-0.558	0.056	8.97,	9.25
531	BAO	WILOHORSE OIVIOE	1- 5	23	0.691	0.02	16.43	16.00	1.20	11.78	-1.30	27.50	-0.400	0.034	16.20,	16.66
542		Z BOISE SHOP	1-5	20	0.000	100,00	0.00	0.00	0.00	-45.82	-45.90	0.10	0.000	0.000	0.00,	0.00

^{*} INDICATES THAT ONE OR MORE MEASURED PRECIPITATION DATA VALUES FELL OUTSIDE THE SPECIFICATION ERROR BAND.

TABLE 39. PRECIPITATION-TEMPERATURE 1987 FLUTTER STUDY STATISTICS FOR SMOTEL SITES IN MONTANA.

	SENSO TYPE	R SNOTEL STATION NAME	JUNE 1987 OATE	NOBS	P/T CORRE- LATION (R)	RANDOM PROB (PCT)		GE OF RE ZERO P (INCHES MIN	REC 1P		RATURE DEGREES MIN		EQUA	RATURE ECTION ATION a + bT) b	SPECIF ERROR LOW	ICATION BANO HIGH
		BAOGER PASS	 1 5		0.118	63.14		11,90		8 85			-0.807	0.091	34,02,	
		BARKER LAKES	1- 5		-0.669	0.12	-	20.20	0.10		-11.70		-0.012		19.88,	-
		BASIN CREEK	1- 5		-0.600	0.40		15.70	0.20		-10.10		0.016		15.47,	
18	PR 10	BEAGLE SPRINGS	1- 5	16	-0.455	7.64	14.62	14.10	0.70	6,17	-7.20	28.10	0.051	-0.009	14.38,	14.86*
28	PR 10	BEAVER CREEK	1- 5	22	0.000	100.00	15.00	15.00	0.00	6.55	-5.80	25.80	0.000	0.000	14.76,	15,24
		BLACK BEAR			-0.676	0.03		25.80	0.10	-	-7.40	-	0.022		25.41,	
		BLACK PINE	1- 5		-0.826	<.01		14.50	0.10		-2.70		0.042		14.34,	
		BLOODY OICK	1-5		0.308	21.44		15,40	0.40		-5.50		-0.037		15.39,	-
		BOULOER MOUNTAIN BOX CANYON	1- 5 1- 5		0.135 0.000	56.96 100.00		19.90 12.20	0.20 0.00		-6.00 -4.90		-0.005 0.000		19.68, 12.01,	
64	PO 10	BOZN EXP FARM	1- 5	21	0.824	<.01	7.21	7.10	0.20	14.22	2 20	26.90	-0.082	0.006	7 12	7.30*
		CALVERT CREEK			-0.228	33.31	8.02	8.00	0.10		-8.60		0.005	-0.001		8,15
		CARROT BASIN			-0.475	2.20		23.00	0.10		-7.70		0.000		22.71,	-
		CASHE CREEK			-0.584	0.68		12.50	0.20	-	-4.00	-	0.026	-0.004	12.46.	
		CLOVER MEADOW			-0.018	93.70		19.50	0.20	-	-	-	-0.002	0.000	19.26,	
105	PR10	COLE CREEK	1- 5	20	-0.686	0.08	26.26	25.90	0.70	7.28	-6.40	25.90	0.135	-0.019	25.84,	26,68
108	PR 10	COMB I NAT 10N	1- 5	20	-0.744	0.01	10.45	10.30	0.30	9.08	-4.80	30.40	0.080	-0.009	10.29,	10.61
111	PR 10	COPPER BOTTOM	1- 5	21	0.548	1.00	14.30	14.00	0.60	11.42	-2.20	34.00	-0.150	0.013	14.09,	14.51*
		COPPER CAMP	1- 5	24	0.150	48.49	26.82	8.40	20.20	8.74	-2.40	25.30	-0. 830		26.43,	
125	PR10	CRYSTAL LAKE	1- 5	20	-0.432	5.69	21.72	21,60	0.20	9.82	-4.40	30.10	0.026	-0.003	21.39,	22.05
130		OALY CREEK	1- 5		0.315	17.58	-	25,50	0.50	6.56	-5.90	31.20	-0.045	0.006	25.32,	26.12
134		OEADMAN CREEK			-0.307	17.55	-	-4.90			-7.30		1.033		10,93,	
144		OIVIOE			-0.154	50.47		14.80	0.10		-		-0.002		14.67,	
		OUPUYER CREEK EMERY CREEK	1- 5 1- 5		0.819 0.036	<.01 87.77		20.90 25.00	1.00 0.60				-0.457 -0.003		21.03, 24.98,	
	5 015	5161150 00554		20	0.701	16.74	26.76	26.60	0.70	6 17	7 00	20.60	0.015	0.007	26.72	27.20
		FISHER CREEK	1- 5		-0.321	16.74		26.60	0.30		-7.80 -2.60		0.015	0.004	26.32,	27,20 55,29*
		FLATTOP MTN. FROHNER MEAOOW	1- 5		0.003 0.588	98.82 0.50		13.40 12.80	43.30 0.60		-2.40		-0.029 -0.137		12.95,	
		GRAVE CREEK			-0.307	17.52		33.00	0.70		-2.80		0.066		32.93.	
		HANO CREEK			-0.545	0.87	-	18.10	0.30		-4.10		0.028		18.01,	
223	RH15	HOOOOO BASIN	1- 5	21	-0.326	14.90	48.05	47.90	0.30	10.73	-1.00	26.90	0.033	-0.003	47.38,	48.72
255	PR10	KRAFT CREEK	1-5	19	0.336	16.01	23.98	23.80	0.30	12,21	0.00	29.90	-0.040	0.003	23,65,	24.31
261	PR 10	LAKEVIEW RIOGE	1- 5	20	-0.784	<.01	14.86	14.70	0.30	9.61	-4.80	30.50	0.071	-0.007	14.63,	15.09
268	PR10	LEMHI RIOGE	1- 5	20	-0.405	7.68	16.69	16.50	0.30	7.04	-5.60	25.30	0.039	-0.006	16.43,	16.95
270	PR 10	LICK CREEK	1- 5	21	-0.137	55.39	18.19	17.80	0.50	9,80	-6.00	34.90	0.009	-0.001	17.90,	18.48*
		LOWER TWIN			-0.480	2.03		25.00	0.20		-5.60		0.014	-	24.71,	-
					0.635				0.20					0.004		
					0.690			34.70	0.60				-0.167	0.016		
		MONUMENT PEAK MULE CREEK			-0.524 -0.314	1.76 17.73	-	20.00 16.30	0.10 0.10		-7.00 -6.90		0.013		19.70, 16.06,	
				0.0	0											
		NEVAOA CREEK			-0.123	60.61		8.50	8.30		-11.10		0.081		15.95,	
		NEZ PERCE CAMP NOISY BASIN			-0.570 -0.230	0.87		17.10	0.10		÷6.70		0.020 0.031		16.90, 39.13,	-
					-0.230 -0.497	37.53 2.17		39.20 11.20	0.60 0.10		-1.30 -6.20		0.031		11.04,	
		PICKFOOT CREEK			-0.285	20.98		16.60	0.10		-4.40		0.015		16.45,	
371	PR 10	PIKE CREEK	1- 5	15	0.864	<.01	33.90	33.80	0,20	8 55	-2 70	27 20	-0.057	0.007	33.41	34.39
		PLACER BASIN			-0.573	0.82		22.00	0.50		-5.10		0.048	-0.008		
		PORCUPINE			-0.093	69.57		-21.10		-	-2.60	-	0.852		9.21,	
					0.248	25.37		17.30	0.30				-0.009	0.002		
400				21		53.02										16.334

^{*} INDICATES THAT ONE OR MORE MEASURED PRECIPITATION DATA VALUES FELL DUTSIDE THE SPECIFICATION ERROR BAND.

TABLE 39. PRECIPITATION-TEMPERATURE 1987 FLUTTER STUDY STATISTICS FOR SNOTEL SITES IN MONTANA (CONTINUED).

			JUNE.		P/T CORRE-	RANDOM		E OF RE		ТЕМРЕ	RATURE	RANGE		RATURE ECTION ATION	SPECIF	ICATION
SITE	SENSC	R SNOTEL	1987		LAT 10N	PROB		(INCHES)	(0	EGREES	C)	(c = a	+ bT)	ERROR	BAN0
NO	TYPE	STATION NAME	DATE	NOBS	(R)	(PCT)	AVE	MIN	OELTA	AVE	MIN	DELTA	а	Þ	LOW	HIGH
405	PR 10	SAOOLE MTN.	1- 5	20	-0.428	5,97	20.62	20.50	0.20	6,40	-7.70	29.70	0.024	-0.004	20.28,	20.96
429	PR10	SHOWER FALLS	1- 5	20	-0.341	14.08	25.97	25,90	0.10	5.87	-5.60	28.80	0.010	-0.002	25,56,	26.38
433	PR 10	SILVER RUN	1- 5	21	-0.585	0.53	14.80	14.70	0.20	9.63	-5.50	32.30	0.030	-0.004	14.57,	15.03
435	PR10	SKALKAHO SUMMIT	1-5	20	-0.609	0.43	23.58	23,50	0.20	4.65	-6.10	26.70	0.012	-0.004	23,21,	23.95
436	RH15	SKYLARK TRAIL	1- 5	21	0.519	1.59	31.73	31.30	0.70	10.15	-1.60	26.30	-0.121	0.012	31.28,	32.18
453	PR10	SPUR PARK	1- 5	22	-0.483	2,28	13.71	-5.90	22.70	5.93	-6.60	29.00	2,567	-0.432	13,49,	13.93*
458	RH15	STAHL PEAK	1- 5	21	0.297	19.10	40.06	39.70	0.70	6.59	-2.50	24.20	-0.043	0.006	39.48,	40.64
482	PR10	TEPEE CREEK	1- 5	20	0.113	63.55	13,26	13,20	0.10	11.19	-0.10	23.70	-0.014	0.001	13.08,	13,44
499	PR 10	TWELVEMILE CREEK	1- 5	21	0.302	18.27	27.64	27.20	1.00	9.44	-5.10	32.60	-0.084	0.009	27.21,	28.07*
500	PR15	TWIN LAKES	1- 5	21	-0.783	<.01	40.92	40.70	0.30	7.95	-4.20	30,10	0.063	-0.008	40,30,	41.54
512	PR 10	WALDRON	1- 5	22	-0.387	7.54	17.45	17.20	0.40	9.09	-4.70	32.70	0.035	-0.004	17,18,	17.72
515	PR10	WARM SPRINGS	1- 5	20	0.563	0.97	22,28	22,20	0.10	1.85	-11.50	33,60	-0.004	0.002	21.88,	22,68
522	PR 10	WHISKEY CREEK	1- 5	21	-0.614	0.30	14.75	14.60	0.40	7.18	-8.40	33,10	0.038	-0.006	14.50,	15.00*
539	PR10	WOOO CREEK	1-5	20	-0.335	14.92	17,70	17,60	0.10	10.81	-2.30	27,90	0.004	-0.001	17.44.	17.96

^{*} INDICATES THAT ONE OR MORE MEASURED PRECIPITATION DATA VALUES FELL OUTSIDE THE SPECIFICATION ERROR BAND.

TABLE 40. PRECIPITATION-TEMPERATURE 1987 FLUTTER STUDY STATISTICS FOR SNOTEL SITES IN NEVADA.

SITE	SENSO	R SNOTEL	JUNE 1987		P/T CORRE- LATION	RANDOM PROB		GE OF RE	RECIP		RATURE		EQUA	ATURE CTION TION (+ bT)	SPEC IF ERROR	ICATION BANO
NO	TYPE	STATION NAME	DATE	NOBS	(R)	(PCT)	AVE	MIN	0ELTA	AVE	MIN	0ELTA	а	ь	LOW	HIGH
21		BEAR CREEK	1- 5	22	0.026	90,92	20.88	20.80	0.10	10.07	-6,20	27.80	0.001	0.000	20,55,	21 21
	PR10	BERRY CREEK	1- 5		0.039	86.92	-	17.50	0.10	•			-0.008		17.32,	
37	RH10	BIG BENO	1- 5	21	-0.408	6,63	10.37	10.20	0.30	12.84	-4.80	28.90	0.076	-0.006	10.21,	10.53*
38	RH10	BIG CREEK SUM	1- 5	22	0.462	3.03	22.40	22.30	0.20	13.55	4.20	18,20	-0.090	0.007	22,13,	22.67
41	RH10	BIG MEAOOW	1- 5	20	0.839	<.01	17.82	17,60	0.40	-18.11	-19.60	4.00	2,171	0.120	17.45,	18.19
55	RH15	BLUE LAKES	1- 5	21	0.355	11,43	22.01	22.00	0.10	13,30	0.40	20.70	-0.024	0.002	21,71,	22,31
72	RH10	BUCKSKIN LOWER	1- 5	18	0.705	0.10	15.74	15.40	0.60	16.11	-1.30	28.30	-0.223		15,52,	
90	RH10	CEOAR PASS	1- 5	22	0.785	<.01	22.58	22.30	0.50	13.87	-3.40	26.50	-0.312	0.022	22.25,	22.91
115	PR 10	CORRAL CANYON	1- 5	21	-0.584	0.54	7.32	-9.10	28,80	13.33	-0.10	22.50	19.900	-1,492	7,22,	7.42
126	RH15	CSS LAB	1- 5	22	0.000	100.00	34.59	34.20	0.80	-49,80	- 49.80	0.00	5,655	0.114	33,50,	35,68
139	RH10	OTAMONO PEAK	1- 5	22	-0.624	0.19	18.03	17.90	0.20	13.71	1.80	20.50	0.134	-0.010	17,80,	18,26
142	PR10	DISASTER PEAK			-0.379	8.19		11.80	0.30	16.12	-1.90	29.00	0.062		11,78,	
143	RH10	OISMAL SWAMP	1- 5	20	0.622	0.34	32,59	32.50	0.20	12.38	-3.50	27.00	-0.075	0.006	32.11,	33.07
149	RH10	OORSEY BASIN	1- 5		-0.520	1.30	11.29	-5.50	23,20	12.89	-2.00	27.00	10.023	-0.778	11.13,	11.45
150	RH10	ORAW CREEK	1- 5	19	-0,695	0.09	6,28	1.40	9.30	11,55	0.00	21.20	4,586	-0.397	6,19,	6.37*
157	RH15	EBBETTS PASS	1- 5	20	0.919	<.01	28,97	27,90	1.80	9,51	2,30	12.30	-1,115	0.117	28,60.	29.34*
158	RH15	ECHO PEAK	1- 5		0.351	9.29		26.50	0.90	15.18	5.40	15,90	-0.272	0.018	26.60,	27.22
168		FALLEN LEAF	1- 5	23	-0.281	19.47	8.00	7.80	0.40	12.36	-2.20	26.30	0.060	-0.005	7.88,	8.12*
171	PR 10	FAWN CREEK	1- 5	21	-0.017	94.26	25.70	19.40	49.10	10.71	-5.40	28,60	0.325	-0.030	25.30,	26.10
189	RH10	GOAT CREEK	1- 5	20	0.339	14.39	21,23	20.80	0,60	8.08	-5.50	23.30	-0.079	0.010	20.90,	21,56*
193	PR 10	GRANITE PEAK	1- 5	21	-0.502	2.05	25,47	25.30	0.40	11.85	0.00	21,60	0.175	-0.015	25,12,	25.82
197	PR10	GREEN MOUNTAIN	1- 5	22	-0.557	0.70	2.44	-10.80	31,60	13,36	2,20	20,50	15,985	-1.196	2,41,	2.47
211	RH10	HEAVENLY VALLEY	1- 5	21	0.319	15.84	18.71	18.70	0.10	14.28	7.00	10.30	-0.054	0.004	18.50,	18.92
220	00.10	HOLE	1-5		-0.768	0.08	7.03	6,90	0.30	14.09	3,80	18.00	0.231	-0.016	-	7.12*
232	PR 10	INOEPENOENCE CAMP	1- 5	23	0.230	29.08	17,31	17.20	0.30	15,15	- 3,20	24.40	-0.057	0.004	17.05,	17.57
	RH10	INDEPENDENCE CREEK			-0.333	12.97		16.30	0.20		-1.40		0.034		16,17,	
234	PR 10	INOEPENDENCE LAKE	1- 5		-	<.01		21.10	0.10	14.13	8.70	12.80	0.127	-0.009	20.96,	
241	PR 10	JACK CREEK UPPER	1-5		0.907	<.01		10.50	18.70		-2.70		-9,413		19.29,	
242 262	PR 10 RH 10	JACKS PEAK LAMANCE CREEK	1- 5 1- 5		-0.751 0.445	<.01 4.33		-3.20 19.40	0.80 0.80	12.50	-2.10 -3.50	24,20	0.421 -0.135	-0.034 0.011	-2.79, 19.41,	-2.87*
	7,,,,,	ENTRINSE SHEEK			0	4,55	.,,,,	.,,	••••		3,30	20,50	••.55	••••	.,,,,	
263	RH10	LAMOILLE #3	1- 5		0.150	52.88	-	19.60	0.30	6,26	-50.00	74.60	-0.009	0.001	19.09,	20.33
266	RH10	LAUREL ORAW			-0.275	21.51	-	-5.00	0.40		-5.50		0.039		-4.74,	
267	RH10	LEAVITT MEADOWS	1- 5		-	<.01		13.80	0.30		-1.00		0.206		13.72,	
279	PR10	LOBOELL LAKE	1- 5 1- 5		-0.272	23.32			0.40	10.56	0.00	17.70	0.049	-0.005	14.70,	
301	PR 10	MARLETTE LAKE	1- 0	22	0,558	0.69	17.38	17.30	0.10	12.50	0.10	20.00	-0.064	0.005	17,14,	17,02
331	RH15	MT ROSE SKI AREA	1- 5	24	-0.323	12,35	26,22	26.00	0.40	11,49	2.80	17.70	0.070	-0.006	25,89,	26.55
333	PR15	MT. ROSE	1- 5	21	0.716	0.02	21.51	20.80	1.60	12.09	3.30	16.70	-0.829	0.069	21.24,	21.78*
375	RH10	POISON FLAT	1- 5	21	0.256	26.27	17.84	17.70	0.40	13.65	-1.30	23.90	-0.057	0.004	17.59,	18,09
		POLE CREEK R.S.	1- 5		0.771	<.01	-	13.40	0.50				-0.177	-	13.45,	
402	RH15	RUBICON #2	1- 5	19	0.265	27.32	19.07	18,60	0.90	12.86	3.00	16.90	-0,279	0.022	18.83,	19,31
423	RH10	SEVENTYS IX CREEK	1- 5	19	0.607	0.59	-4.96	-5.10	0.20	12.04	-3.90	25.90	-0.064	0.005	-4.89,	-5.03
444	RH15	SONORA PASS			-0.888	<.01		16.90	0.50	13.32		20.40	0.292		16.97,	
450		SPRATT CREEK	1- 5	13	-0.578	3.83	14.54	14.40	0.20	15.43	0.90	22.70	0.080	-0.005	14.35,	14.73
		SQUAW VALLEY G.C.	1- 5		-0.751	0.01		24.70	1.70	11.38		15.70	1.316		25.05,	
4 78	PR10	TAHOE CITY CROSS	1- 5	11	0.929	<.01	15.93	15,60	0.50	13.00	1.20	22.90	-0.331	0.025	15.72,	16.14
480	RH10	TAYLOR CANYON	1- 5	21	-0,225	32.70	8,56	6.60	20.80	12.89	-6.30	32.60	1.840	-0.143	8.42.	8.70
	PR 10	TRUCKEE #2	1- 5		-0.370	17.48		15.40	0.10	16.79		25.20	0.032		15.28,	
		VIRGINIA LAKES	1- 5		-0.609	0.33		13.90	0.10	8,55		14.90	0.063	-0.007	13.75,	14.13
513	RH15	WARO CREEK #3	1- 5	21	0.867	<.01	32.70	32,40	0.60	12.89	-2.80	25.80	-0.242	0.019	32,22,	33.18
514	RH10	WARO MOUNTAIN	1- 5	21	-0.748	<.01	15.41	15.20	0.40	13.18	3.40	20.00	0.217	-0.016	15.22,	15.60
520	RH15	WET MEADOWS	1- 5	6	-0.953	0.33	18 35	18.00	0.70	11.28	-0.50	19.30	0.452	-0,040	18.10,	18.604
-20			, ,		0.775	در. ۵	.0,00	.0.00	5.70	20	0.50	. ,, ,,		3,540	,	. 5,00

^{*} INDICATES THAT ONE OR MORE MEASURED PRECIPITATION DATA VALUES FELL DUTSIDE THE SPECIFICATION ERROR BAND.

TABLE 41. PRECIPITATION-TEMPERATURE 1987 FLUTTER STUDY STATISTICS FOR SNOTEL SITES IN OREGON.

		a note	JUNE		P/T CORRE-		FOR	E OF RE	RECIP		RATURE		CORR EQU			ICATION
NO	SENSOF TYPE		1987 OATE		LATION (R)	PROB (PCT)	AVE		OELTA	AVE		OELTA	a	a + bT) b	ERROR LOW	HIGH
1	RH10	ADIN MTN	1- 5	20	-0.732	0.02	16.58	16.40	0.40	11.32	-10.10	35.80	0,080	-0.007	16.29,	16.87
			1- 5		-0.889	<.01		29.20	0.70		-6.60		0.189	-0.023		
			1- 5 1- 5		0.858	<.01		27.50	0.70				-0.257		27.36,	
		BIG REO MOUNTAIN	1- 5		0.653 0.431	0.05 5.77		18.40 33.20	0.20 7. 30	13.14			-0.068 -1.522		18.28, 39.18,	
44	RH15	BIGELOW CAMP	1- 5	20	0.919	<.01	48.22	47.60	1.00	15.46	-1.90	28,90	-0.446	0,029	47.53,	48.91
45	RH15	BILLIE CREEK OIVIOE	1- 5	22	-0.853	<.01	32.81	32.10	1.50	15.30	-3.90	35.20	0.684	-0.044	32.32,	33.30*
		BLAZEO ALOER	1- 5		-0. 698	0.04		78,60	1.60		-1.00		0.478	-0.043	78.26,	80.48
		BLUE MOUNTAIN SPRING			0.677	0.10		20.10	3.40	15.56			-1.591		21.24,	
60	RH10	BOURNE	1- 5	19	-0.901	<.01	22.06	21.50	1.00	14.52	-1.50	31.90	0.417	-0.029	21.75,	22,37
		BOWMAN SPRINGS	1- 5		-0.433	5,63		19.30	0.20		-0.70		0.061	-0.005		
		CASCAGE SUMMIT	1- 5		0.848	<.01		44.00	1.90			30.30			44.05,	
		CHEMULT ALTERNATE	1- 5		0.323	17.66		16.20	0.20	-		-	-0.044		16.07,	
97 100		CLACKAMAS LAKE CLEAR LAKE	1-5		0.035 -0.284	88.15		-27.50	72,60				-1.339	0.119		9,94
100	KHID	CLEAR LAKE	1- 0	21	- 0.284	21.22	24.86	-13.60	43.90	11.07	-0.20	26,80	5.996	-0.542	24.52,	25,20
104		COLO SPRINGS CAMP	1- 4		-0.927	0.09	34.56	34.50	0.30	12.79	- 3.50	26.10	0.172	-0.013	34.05,	35.07
					-0.447	4.23		16.30	0.10		-1.40		0.033		16.13,	
					-0.858	<.01		63.60	1.70		-0.20		0.794		63.58,	
	RH10	-	1-5		0.273	23.09		16.70	6.00	-	-4.40	-	-0.603		21.72,	
158	кніэ	O IAMONO LAKE	1- 5	22	0.830	<.01	32,21	31.60	1.10	15.54	-3,50	29,80	-0.508	0.038	31.73,	32,69*
165	RH10	EMIGRANT SPRINGS	1- 5	24	0.857	<.01	26.29	26.10	0.40	14.41	-0.50	29.30	-0.174	0.012	25.93,	26.65
172	RH15	FISH CREEK	1- 5	21	-0.857	<.01	27.47	26.50	2.40	10.33	- 5.00	23,40	0.960	-0.093	27.05,	27.89*
			1- 5		0.882	<.01		26.80	1.20				-0.568		26.84,	
			1-5		-0.381	9.73		32.00	0.60		-0.80		0.131		31.89,	
190	RH10	GOLD CENTER	1- 5	19	0.729	0.03	15.15	14.60	0.90	12.77	-3.40	26.50	-0.384	0.030	14.93,	15.37
198	PR10	GREENPOINT	1- 5	20	0.621	0.34	24.59	23.80	1.70	10.02	-0.60	24,20	-0,600	0.059	24.25,	24.93
			1- 5	21	0.854	<.01		35.10	1.00	16.76			- 0.586		35.17,	
			1- 5		0.752	<.01		60.30	0.30	11.28			-0.091		59.55,	
			1-5		-0.622	0.20		50.50	1.00			27.90			50.29,	
229	RHIO	HYATT PRAIRIE	1- 5	22	0.842	<.01	22.02	21.40	1.50	14.77	-2,70	30,20	-0.588	0.040	21.70,	22,34
	RH20	IRISH TAYLOR	1- 5		-0.245	29.78		45.90	0.90		- 6.90		0.048		45.54,	
			1- 5		0.674	0.08		59.00	1.40				-0.602		58.85,	
251			1-5		0.918	<.01		45.40	4.70	16.33	0,60		-2.787		46.68,	
256 276		LAKE CREEK R.S. LITTLE MEADOWS	1- 5 1- 5		-0.371 -0.932	9.81 <.01		15.60 87.60	3.60 1.40		-0.80	31.20 28.70	0.453 0.616		16.09, 87.15,	
207	po 1 0	LINCKY STRIKE	1 5	22	-0.818	. 01	20.76	20 30	0.10	11 52	-2.80	70 00	0.056	-0.00F	20.46,	21.06
		LUCKY STRIKE MADISON BUTTE			-	<.01		20.70						-0.006		
					-0.714	0.01		61.80	0.40		0,60		0.126		61.15,	
					-0.039	89.88		58.20	0.60			26.20			57.77,	
					-0.935	<.01		34.70	1.00	-		27.70	0.343		34.63,	
330	RH20	MT HOOD TEST SITE	1- 5	24	-0.146	49.59	75.25	75.10	0.20	9.12	- 2.80	24.50	0.016	-0.001	74.15,	76,35
					0.024	92.33	-	-17.50		12.33			-1.278		21.08,	
341	RH15				-0.287	26.45	25.01	24.70	0.60	12.46	-3.50		0.074	-0.006	24.64,	25.38
					-0.289	29.67		-39.10	143.00	13.39	5.70	16.30	46.262		42.10,	
352	PR 10	OCHOCO MEADOWS	1- 5	20	- 0.607	0.45	22.18	21.80	0.80	13.19	-2.90	28.10	0.249	-0.019	21.86,	22,50
			1- 5		0.841	<.01	•	45.70	3.10	13.49			-1.085		46.18,	
			1- 5			0.07		12.50	2.00				-0.840		13.36,	
					-0.930	<.01		38.40	1.30	17.29			0.614		38.58,	
					-0.694	1.22		86,80		14.08			0.433		86.35,	
241	KHID	ROARING RIVER	1- 0	10	0.086	75.10	- 26 .7 7	-31,90	19.10	14.78	∪ه,د−	J4.40	-3,351	0.221	-26.37,	-21.17

^{*} INDICATES THAT ONE OR MORE MEASURED PRECIPITATION DATA VALUES FELL OUTSIDE THE SPECIFICATION ERROR BAND.

TABLE 41. PRECIPITATION-TEMPERATURE 1987 FLUTTER STUDY STATISTICS FOR SNOTEL SITES IN OREGON (CONTINUED).

													TEMPER	RATURE		
					P/T		RANG	E OF RE	ADINGS				CORRI	ECTION		
			JUNE		CORRE-	RANDOM	FOR	ZERO F	RECIP	TEMPE	RATURE	RANGE	EQU/	ATION	SPECIF	ICATION
SITE	SENSO	R SNOTEL	1987		LATION	PR0B		(INCHES	()	(0	EGREES	C)	(c =	a + bT)	ERROR	8AND
		STATION NAME	DATE			(PCT)	A VE		DELTA	AVE		0ELTA	a	b	LOW	HIGH
		ROCK SPRINGS				83,49								0.000		
404	RH20	SADOLE MOUNTAIN	1- 5	20	-0.833	<.01	83.71	81.60	3.10	11,23	0.50	23.70	1,169	-0.105	82.59.	84.83*
407	RH15	SALT CREEK FALLS	1- 5	22	-0.921	< .01	48.10	47.20	1,50	14,63	2.00	24,30	0.859	-0.059	47.48.	48.72*
411	RH15	SANTIAM JCT.	1-5	21	-0.757	<.01	54.12	53.80	0.80	14.22	-2.30	30,10	0.318	-0.022	53.34.	54.90
414	RH10	SCHNE TOER MEADOWS	1- 5	19	0.945	<.01	29,32	29,00	0.70	10.65	-3,60	28.00	-0.248	0,023	28.88.	29.76
															•	
420	RH20	SEINE CREEK	1- 5	21	-0.622	0.25	66.09	65,60	1.00	6.12	-4.90	24,60	0.146	-0.025	65.07.	67.11
431	RH10	SILVER CREEK	1- 5	18	-0.129	60.93	18.61	18.40	0.40	14.84	-4.90	33,60	0.023	-0.001	18.32.	18.90
434	RH10	SILVIES	1- 5	21	0,608	0.34	22.00	21.90	0.20	12.86	-5.30	25.40	-0.101	0.008	21.66,	22.34
441	PR 15	SNOW MOUNTAIN	1- 5	20	-0.931	<.01	22,27	22,10	0.40	11,52	-4.50	27,30	0.171	-0.014	21.93.	22.61
460	RH10	STARR RIDGE	1-5	23	0.346	10.58	13.01	12.80	0.40	15.53	-2.40	31,30	-0.070	0.005	12.82.	13,20*
465	PR 10	STRAWBERRY	1- 5	21	0.282	21.53	12.97	12.70	0.50	15.77	-3.40	29.80	-0.082	0.005	12.78,	13.16*
471	PR10	SUMMER RIM	1- 5	21	0.109	63.72	14.26	11.30	29.00	7.20	-8.90	24.00	-0.823	0.114	14.02.	14.50*
472	RH15	SUMMIT LAKE	1- 5	21	-0.343	12.76	49.08	48.40	1.10	10.00	-5.60	31.10	0.115	-0.012	48.31,	49.85
479	RH15	TAYLOR BUTTE	1- 5	21	-0.732	0.01	11,43	11,30	0.40	14.49	-6,60	36.80	0.123		11,25,	
481	RH15	TAYLOR GREEN	1- 5	23	-0.914	<.01	22,63	22,00	1,60	12.07	-1.60	24.50	0.757	-0.063	22.31.	22.95*
					•	•	-	-	•	-	-	-	·	-		
483	RH15	THREE CREEKS MEADOW	1- 5	17	-0,263	30,71	28,81	27,70	6.80	12.28	-3,50	30,90	0.890	-0.072	28.38.	29,24*
		TIPTON				0.01	-	18.00	-	13.94	-	25,50	-	-	17.94.	-
536		WOLF C	1- 5	21	-0.404	6.93	-	20,30	-	20.47	4,10	29.10	0.112	-0.006	20.25.	20.75
		-				•	•	•	•	-	•	•				

^{*} INDICATES THAT ONE OR MORE MEASURED PRECIPITATION DATA VALUES FELL OUTSIDE THE SPECIFICATION ERROR BAND.

TABLE 42. PRECIPITATION-TEMPERATURE 1987 FLUTTER STUDY STATISTICS FOR SNOTEL SITES IN UTAH.

														RATURE		
			turic.		P/T	DANDONA		E OF RE		TELLOS	0.4.7.10.5	0.4405		ECTION		
0.475	CENCO	n cuote	JUNE			RANDOM	FOR	ZERO F			RATURE			AT ION		ICATION
	SENSO TYPE	R SNOTEL STATION NAME	1987 0ATE	NOBS	LATION (R)	PROB (PCT)	AVE	(INCHES	DELTA	AVE	DEGREES	C) OELTA	(c = a	a + bT) b	ERROR LOW	BAN0 HIGH
	UT 10 PR 10	ATWOOD LAKE	1-5		0.035	87.56		16.60		-51.30			78.170		17.28,	
	PR 10	BEAVER DAMS	1-5		-0.822	<.01	16.94	16.60	0.80	11.09	0.00		0.358	-0.033		17.17*
	RH15	BEAVER DIVIDE BEN LOMOND PEAK	1- 5 1- 5		-0.533 0.474	1.27 5.45		16.20 38.50	0.10 4.50	13.30 14.27	-0.40	27.70	0.041	-0.003	16.00,	
	PR 10	BEN LOMONO TRAIL	1- 5		0.460	4.10		27.70	7.30	-	1.30 -2.00		-1.335 -1.554		39.46, 29.48,	
40	PR 10	BIG FLAT	1- 5	11	-0.148	66.43	10 52	19,40	0.30	2.04	-4.90	15 20	0.005	-0.003	10.22	10.02
48		BLACK FLAT	1- 5		0.249	26.44		14.20	1.70	9.79		17.00	-0.151		19.22, 15.35.	
63	PR 10	BOX CREEK			-0.015	94.71		15.60	0.20	11.87		18.00	0.001		15.53,	
67	PR 10	BROWN OUCK	1- 5			26.21		23.30	0.20		-3.30		0.019		23.09,	
70	PR10	BUCK FLAT	2- 5		0.000	100.00		13.00	0.00	9.79	-0.80		0.000		12.82,	
73	PR 10	BUG LAKE	1- 5	20	0.000	100.00	19 10	19.10	0.00	9 85	-0.80	22 90	0.000	0.000	18.83,	19 37
81		CAMP JACKSON	1- 5		0.737	<.01		16.00	0.90	13.73		15.50	-0.623		16.23,	
	PR 10	CASTLE VALLEY	1- 5		-0.141	55,21		17.00	5.30	12.66	0.40	26.70	0.314			18.01*
91	PR10	CHALK CREEK #1	1-5		-0.797	1.01		23.80	0.50	11.52	5,50	15.20	0.273		23.76,	
		CHALK CREEK #2	1- 5		0.429	5.91		16.10	0.30	11.99	1.20	20.50	-0.060		15.95,	
95		CHEPETA	1- 5	12	0.708	0.99	18.32	18,20	0.20	9,28	1.30	15.30	-0.062	0.007	18.08,	18.56
98	PR10	CLEAR CREEK #1	1- 5		0.470	2.73		16.40	0.80	-	-1.40		-0.197		16.44.	
99		CLEAR CREEK #2	1- 5		0.057	82.81		14.80	0.40	11.44			-0.011	-	14.80,	
129	PR 10	CURRANT CREEK	1- 5	23	-0.641	0.09		13.30	0.20	10.21	-4.00		0.055		13.22,	
132		DANIELS	1- 3	13	-0.784	0.15	16.28	16.20	0.20	12.38	3.40	18.20	0.128	-0.011	16.08,	16.48
140	RH10	OILL'S CAMP	1- 5	21	0.791	<.01	16.96	16.70	0.60	10.51	2,20	17,40	-0.299	0,028	16.74.	17.18*
148		OONKEY RESERVOIR	1-5	18	0.976	<.01	24.17	22.30	3.40	-8.91	-43.10	64.00	0.396	0.045	23.47,	24.87*
151	PR 10	ORY BREAD PONO	1- 5	20	-0.254	27.95	16.60	16.50	0.10	10.93	-1.80	23.10	0.004	-0.001	16.36,	16.84
156		EAST WILLOW CREEK	1- 5	19	0.871	<.01	17.77	17.20	1.10	14.03	7.30	14.90	-0.986	0.070	17.57,	17.97*
169	PR 10	FARMINGTON	1- 5	20	-0.712	0.04	-16.02	-16.70	1.20	11.97	2.00	21.40	0.502	-0.041	-15.81,	-16.23*
170	RH10	FARNSWORTH LAKE	1- 5	21	0.855	<.01	25.09	24.50	1.40	11.06	0.50	20.10	-0.758	0.068	24.75,	25,43*
176	UT 10	FIVE POINTS LAKE	1- 5	22	0.447	3,69	16.39	15.70	1.40	6.92	-4.10	19.40	-0.185			16.64*
179	PR10	FRANKLIN BASIN	1- 5	20	0.000	100.00		24.60	0.00	8.73	-2.80		0,000		24.24,	
191	RH10	GOOSEBERRY R.S.	1- 5		0,620	0.27		18,80	0.60	11,61					•	19.32*
208	PR 10	HARRIS FLAT	1- 5	20	-0,695	0.06	11.19	11,10	0.20	14.13	-0,20	22.80	0.079	-0.006	11,04,	11.34
210	PR10	HAYDEN FORK	1- 5		-0.612	0.41	-	20.00	0.30		-1.90		0.094		19.89,	
214		HEWINTA	1- 5		0.744	<.01		18,60	2,60	8.00		21,60	-0.922			20.16*
215		HICKERSON PARK	1- 5		0.597	0.33	18.18	18.00	0.40	9.46	-4.70		-0.131	0.014	17.90,	
221		HOLE	1- 5		0.000	100.00		17.70	0.20	10.05			0.000	0.000	17.53,	
226	PR 10	HORSE RIOGE	1- 5	20	-0,405	7,63	19,10	18,90	0.40	12.73	2.40	19,90	0.076	-0. 006	18.86,	19.34
		INDIAN CANYON			-0.052	82.12	-	17.30			-0.30		0.006			17.79*
		KIMBERLY MINE			-0.597	0.54		23.00	0.70		-0.60			-0.016		
		KING'S CABIN	1- 5		0.390	8.06		15.00	0.20				-0.046		14.90,	
254 259		KOLOB LAKEFORK #1	1- 5 1- 5		0.704 0.048	0.05 83.34		19,90 18,50	0.70 0.30	14.31 6.57	6.10 -3.50		-0.354 0.000		20.17, 18.37,	20.63* 18.93
		LAKEFORK BASIN	1-5		0.000	100.00		15.90		-51.30		0.00	3,667		15.92,	
		LASAL MOUNTAIN	1-5		0.830	<.01	-	27.70	1.80	11.71			-0.801		28.26,	
		LIGHTNING LAKE	1- 5		0.767	<.01		32,30	3.30	5.78	-4.00		-0.662			34.03*
		LILY LAKE LITTLE BEAR	1- 5 1- 5		-0.534 0.716	3.30 0.03		20.00 21.20	0.30 0.90	9.84 13.35		23.80 22.00	0.080 -0.412		19.83, 21.35,	21.91*
275		LITTLE COACCY	, ,	22	0 571	1 10	12 30	11 00	0.00	10 27	7 50	20 70	-0.445	0.024	12 25	12 51=
275	DH10	LITTLE GRASSY LONG FLAT	1-5		0.531 0.568	1.10		11.90	0.90	18.23					12.25, 14.67,	
283	KH 1U	LONG VALLEY JCT	1- 5		-0.057	1.12 78.31		14.20 12.50	1.20 0.10	11.20 15.29		23.20	-0.498 0.007		12.38,	
298		MAMMOTH	1- 5		-0.305	15.70		15.80	0.10		-1.00		0.007		15.76,	
	RH10	MERCHANT VALLEY	1- 5		0.667	0.09		13.90					-0.195			14.61*

^{*} INDICATES THAT ONE OR MORE MEASURED PRECIPITATION DATA VALUES FELL OUTSIDE THE SPECIFICATION ERROR BAND.

TABLE 42. PRECIPITATION-TEMPERATURE 1987 FLUTTER STUDY STATISTICS FOR SNOTEL SITES IN UTAH (CONTINUED).

					P/T		RANG	E OF RE	ADINGS					RATURE ECTION		
			JUNE			RANDOM				TEMPE	DATIBLE	PANCE	-	ATION	CDCC IE	ICATION
SITE	SENSO	R SNOTEL	1987		LATION	PROB		(INCHES			EGREES		•	a + bT)		
	TYPE		OATE	NOBS		(PCT)	AVE		OELTA	AVE		DELTA	a .	b	LOW	HIGH
		MIOWAY VALLEY				0,59		23,80	0.20	11.02			0.072	-0,006		
		MONTE CRISTO			-	67.08		21.30	0.80	-	-5.90	-	0.028	-0.004		
324	RH10	MOSBY MTN.				<.01		18.10	0,60	11,40	-	21,20	0.284	-	18.26.	
363		PARLEY'S SUMMIT				2,66	20.31	-	0.20	14.73	-	24.80	0.057	-	20.05.	-
					-0.605	0.28		19.50	0.30	-	0.60	-	0.115	-		-
					-0.207	38.07		18.00	1.20				0.089		18,69,	-
	RH10	PINE CREEK				8.59		19.30	0.20	13.30	0.80		0.051	-	19.16,	-
	PR10		1-5		0.124	60.12		18.70	0.40	•		20.80			18.71,	
	RH10		1- 5		0.454	2.96	•	14.00	1.20	-	-	-	-0.192		14.30,	-
401		ROCKY BASIN	1- 5	22	0.589	0.39	31.36	31.30	0,20	10.76	-0.90	23,10	-0.061	0.006	30.92,	31.80
419	PR10	SEELEY CREEK	1- 5	22	0.000	100.00	20.40	20.40	0.00	7.67	-0.10	16.00	0.000	0.000	20.12,	20,68
439	PR10	SMITH & MOREHOUSE	1- 5	21	0.246	28.20	18.40	18.30	0.10	10.74	-3.80	27.70	-0.011	0.001	18.12,	18.68
461	PR 10	STEEL CREEK PARK	1- 5	19	0.000	100.00	22.00	22.00	0.00	8.23	- 2.50	18.90	0.000	0.000	21.68,	22.32
466	PR10	STRAWBERRY OIVIDE	1-5	20	-0.818	<.01	16.75	16,50	0.40	14.51	3.70	21.70	0.178	-0.012	16.54,	16.96*
484	RH10	TIMPANOGOS OIVIOE	1- 5	20	0.353	12.68	18.92	18.50	0.90	14.26	3.00	21.30	- 0.209	0.015	18,68,	19.16*
487	PR 10	TONY GROVE LAKE	1- 5	20	0.267	25,45	24.92	24.80	0.20	9.97	-0.90	24.00	-0.028	0.003	24.57.	25,27
492	PR10		1- 5		0.372	8.86		23.30	0.20				-0.035	-	23.07,	
497	RH10	TROUT CREEK			-0.714	0.01	-	16,00	0.30	-	-3.00	-	0.102		15.97.	
508	PR 10	VERNON CREEK	1- 5	20	-0.376	10.21	15.18	15.10	0.10	15,13	3.30	23.60	0.029		14.99.	
518	PR10	WESSTER FLAT	1- 5	20	0.522	1.82	18.73	18,60	0.20	15.25	6.20	16.00	-0.115		18.52,	
528	PR 10	WHITE RIVER #1	1- 5	19	-0.601	0,65	15 51	15.40	0.30	10.71	-2.40	24 . 40	0.087	-0.009	15 29	15.73
					-0.610	0.20	-	19.80	-	12.39	-	20.90	-	-	19.72.	-
123		"103102 #3)		0.010	0.20	12.33	12.00	0.50		0,70	20.70	0.110	0,007	17012,	20,20

^{*} INDICATES THAT ONE OR MORE MEASURED PRECIPITATION DATA VALUES FELL OUTSIDE THE SPECIFICATION ERROR BAND.

TABLE 43. PRECIPITATION-TEMPERATURE 1987 FLUTTER STUDY STATISTICS FOR SNOTEL SITES IN WASHINGTON.

													TEMPER	RATURE		
					P/T		RANG	E OF RE	AOINGS				CORRE	ECTION		
			JUNE		CORRE-	RANDOM	FOR	ZERO P	RECIP	TEMPE	RATURE	RANGE	EQUA	ATION	SPECIF	ICATION
SITE	SENSO	R SNOTEL	1987		LATION	PR0B		(INCHES)	(0	EGREES	C)	(c = a	a + bT)	ERROR	BAN0
NO	TYPE	STATION NAME	OATE	NOBS	(R)	(PCT)	AVE	MIN	OELTA	AVE	MIN	0ELTA	a	b	LOW	HIGH
52		BLEWETT PASS	1- 5	21	0.906	<.01	25.98	25.30	1.40	12.82	0.00		-0.630	0.049		26.33*
75	RH15	BUNCHGRASS MOW	1-5	21	-0.437	4.75	37.37	37.00	0.70	10.09	-0.70	24.30	0.106	-0.010	36.85,	37.89
116	PR 15	CORRAL PASS	1- 5	19	-0.796	<.01	47.67	47.10	1.00	7.98	-3.30	25,20	0.254	-0.031	46.96,	48.38
118	RH15	COUGAR MOUNTAIN	1- 5	19	0.272	25.97	77.23	76.70	1.10	11.35	-0.70	25.90	-0.161	0.014	76.16,	78.30
173	RH15	FISH LAKE	1- 5	20	0.862	<.01	50.90	49.90	1.90	6.06	-4.20	24.00	-0.415	0.069	50.13,	51.67*
196	RH10	GREEN LAKE	1-5	18	0.000	100.00	27.90	27.90	0.00	9.43	-3.20	27.30	0.000	0.000	27.49,	28.31
201	RH10	GROUSE CAMP	1-5	23	-0.536	0.83	31.42	31.30	0,20	10.22	-2.50	23.50	0.069	-0.007	30.96,	31.88
209	RH20	HARTS PASS	1- 5	20	0.279	23.39	63,62	63,30	0.50	6.68	-4.60	22.30	-0.040	0.007	62,65,	64.59
246	RH25	JUNE LAKE	1- 5	22	-0.898	<.01	127.24	101.00	42.70	12.08	0.50	22,90	18.442	-1.526	125,53,	128.95*
294	RH25	LYMAN LAKE	1- 5	21	0.708	0.03	78,98	78.70	0.60	9.52	-2.80	26.30	-0.167	0.017	77.83,	80.13
314	RH20	MIRROR LAKE	1- 5	19	-0.768	0.01	45.60	45.00	1.10	6.77	-3.50	23.20	0.244	-0.036	44.92,	46,28
3 23	RH20	MORSE LAKE	1- 5	21	0.710	0.03	78.36	77.80	1.80	10.02	-0.50	24.70	-0.556	0.055	77.28,	79.44*
353	RH25	OLALLIE MEADOWS	1- 3	6	0.000	100.00	94.60	94.60	0.00	4.53	-1.50	18.00	0.000	0.000	93,26,	95.94
358	RH25	PARAO I SE	1- 5	21	-0.701	0.04	93.14	92,90	0.40	9.00	-2.10	25,30	0.082	-0.009	91.80,	94.48
360	RH15	PARK CREEK RIOGE	1- 5	21	0.767	<.01	57.31	56,90	0.90	5.46	-3.40	18,70	-0.182	0.033	56.46,	58.16
370	RH15	PIGTAIL PEAK	1- 5	20	-0.832	<.01	51.89	51.00	1.40	8.00	-2.40	24.60	0.406	-0.051	51.14,	52.64*
374	RH25	PLAINS OF ABRAHAM	1- 5	21	0.822	<.01	102.38	101.20	3.30	11.34	0.00	21.20	-1.610	0.142	100.99,	103.77*
377	RH10	POPE RIOGE	1-5	20	-0.699	0.06	27.99	27.70	0.60	11.68	-4.00	26.40	0.173	-0.015	27.57,	28.41
380	RH25	POTATO HILL	1- 5	19	-0.524	2.13	49.91	49.60	0.50	10.14	-1.40	26.40	0.132		49.21,	
3 85		QUARTZ PEAK	1- 5	23	0.922	<.01	31.97	31.30	1.40	12.64	-0.60	25.80	-0.560	0.044	31.53,	32.41*
389	RH25	RAINY PASS	1- 5	21	-0.457	3,73	49.65	49.50	0.30	6.09	-3.20	24.50	0.029	-0.005	48.92,	50.38
406	PR 15	SALMON MEAOOWS	3- 5	5	-0.066	91.64	15.06	15.00	0.10		13,60	8.80	0.019		14.93,	
412	RH15	SASSE RIOGE	1- 5	22	0.569	0.57	-	43.30	0.50			27.80	-0.122		42.78,	
425	RH25	SHEEP CANYON	1-5		-0.691	0.05	110.90	-	0.60	11.16	-	22,90	0.189	-	109.37,	-
448	RH20	SPENCER MEADOW	1- 5	22	-0.022	92.36	77.25	76.50	1.40	16.99	1.70	28.50	0.024	-0.001	76.25,	78.25
449		SPIRIT LAKE	1- 5	21	-0.056	80,78	74.50	74.20	0.90	11.98	0.90	22.70	0.019	-0.002	73.51,	75.49
459	RH25	STAMPEOE PASS	1- 5	17	0.761	0.03	40.68	37.70	6.20	4.02	-7.10	25.80	- 0.827	0.206	40.02,	41.34*
462	RH20	STEVENS PASS	1- 5	20	-0.963	<.01	70.06	69.40	1.20	-	-2.30		0.451	-0.046		
467	RH25	STRAWBERRY LANGING	1- 5	22	-0.882	<.01	77.32	76.80	1.10	9.99	-1.30	22.80	0.496	-0.050	76.23,	78.41
475	RH25	SURPRISE LAKES	1- 5	23	-0.834	<.01	69.93	69,60	0.50	15,97	4.10	28.10	0.251	-0.016	69.08,	70.78
488	RH15	TOUCHET #2	1- 5	21	0.795	<.01	39.04	38.80	0.50	12.01	-2.90	26.20	-0.185	0.015	38.47,	39.61
495	RH15	TROUGH	1- 5	20	0.435	5.52	17.74	16.70	2.70	6.51	-3,80	17.40	-0.486	0.075	17.47,	18.01*
505	RH10	UPPER WHEELER	1- 5	22	-0.165	46.37	20,30	20.00	0.50	11.36	-0.40		0.046	-0.004	- •	20.58*
527		WHITE PASS E.	1-5	20	0.456	4.31	31.43	31.00	0.70	9.87	-0.70	24.80	-0.176	0.017	30.99,	31.87

^{*} INDICATES THAT ONE OR MORE MEASURED PRECIPITATION DATA VALUES FELL OUTSIDE THE SPECIFICATION ERROR BAND.

TABLE 44. PRECIPITATION-TEMPERATURE 1987 FLUTTER STUDY STATISTICS FOR SNOTEL SITES IN WYOMING.

		,			P/T			E OF RE					TEMPER			
			JUNE		CORRE-	RANDOM	FOR	ZERO P	RECIP	TEMPE	RATURE	RANGE	EQU#	ATION	SPECIF	ICATION
SITE	SENSO	R SNOTEL	1987		LATION	PROB		(INCHES	5)		EGREES			a + bT)	ERROR	
NO	TYPE	STATION NAME	OATE	NOBS	(R)	(PCT)	AVE	MIN	OELTA	AVE	MIN	0ELTA	a	b	LOW	HIGH
		BALD MTN.			-0.363	9,68		20,90	0.20		-9.50		0,011			
			1- 5		0.743	0.09		17.60	1.70		-	-	-0.514	-0.003	18.09.	
17	11(10	BATTLE MOUNTAIN			-0.176	43.45		14.30	0.20		-2.40		0.019		14.20,	
	PR 10	BEAR TRAP MEADOW	1- 5		0.294	18.34		15.60	0.20				-0.015		15.49.	
		BEARTOOTH LAKE	1- 5		0.809	<.01		15.00	1.00				-0.174		15.39,	
43	RH10	BIG SANOY OPENING	1- 5	24	0.955	<.01	17 39	16.70	1.80	7 53	-3 70	24 90	-0,551	0.073	17.13,	17 65#
	PR 10	BLACKWATER	1- 5		0.386	11.34		21.20	0.60				-0.018		21.28,	
	PR 10		1- 5		-0.768	<.01		19.50	0.20		-3.00		0.050		19.33,	
57		BONE SPRINGS OIV	1- 5		0.688	0.11		19.80	0.30				-0.039		19.66,	
66	PR10	BROOKLYN LAKE	1- 5		0.302	18.31		20.20	0.10		-10.20		0.003		19.85,	
76	PR 10	BURGESS JUNCTION	1- 5	10	0.641	0.41	16 22	15,80	0.70	0.11	_13_00	27 50	-0.005	0.017	15,92,	16 524
78	PR 10	BURROUGHS CREEK	1- 5		-0.069	76.49		-2.10			-3.50		0.370		19.84,	
		CANYON	1- 5		0.728	0.02		14.50	0.90				-0.140		14.64,	
87			1- 5		0.636	0.14		24.30	0.50		6.50		-0.436		24.20,	
					-0.018	94.04		-3.90			-3.20	-	0.207		15.93,	
	~	0.000 0504 0505000			0.445	60 03	00.56		0.40	2 01		26.00	0.000	0.001	20.01	
101	PKIU	CLOUD PEAK RESERVOIR COTTONWOOD CREEK			0.115	62.87		20.30	0.40	-		-	-0.008 -0.117		20,21,	
117	DU15		1-5		0.382	10.60	-	20.90	0.90	-	-	-	-0.117	-	. ,	-
141		COULTER CREEK OINWOODY	1-5		0,663	0.10		19.20	1.10	-			-1.645		19.26, 12.50,	
			1- 5 1- 5		0.600	51.09 0.24		-14.90 17.30	32.60 1.20				-0.340		17.61,	
	PR 10				-0.048	83,27		17,20	0.20		-7.00		0.005		17.04,	
155			1- 5		0.924	<.01		15.70	0.40				-0.161		15.67,	
			1- 5		0.595	0.44		17.10	1.80			24.00			17.71,	
167			1- 5		0.598	1.12		23.70	0.50				-0.064		23.64,	
194	RH 15	GRASSY LAKE	1- 5	21	-0.910	<.01	27.07	26.30	1,20	8,79	- 5.20	28,30	0,337	-0.039	26,65,	27,49*
200	RH10	GROS VENTRE SUMMIT	1- 5	22	-0.470	2.74	15.19	15,00	0.40	7.88	-5.90	27.70	0.051	-0.006	14.95,	15,43
204		HAMS FORK	1- 5		0.865	<.01		13.80	0.50				-0.179		13.80,	
207		HANSEN SAWMILL	1- 5		0.406	6.77		14.30	0.40		-		-0.040		14.39,	
	PR 10	HOBBS PARK	1- 5		0.096	69.46		-3.70		-	-	-	-0.264		17.76,	
237	RH10	INOIAN CREEK	1- 5	20	0.961	<.01	21.70	21.50	0.50	8.17	-3. 90	23,60	-0.188	0.023	21.37,	22.03
238	PR 10	IRISH ROCK	1- 5	10	0.339	33.78	-	11.90	0.20	2.80	-6.30	25,60	-0.009	0.003	11.83,	12.21
247	PR 10	KELLEY R.S.	1- 5	19	0.757	0.01	17.15	17.00	0.50	8.94	-3.00	25.70	-0.122	0.013	16.90,	17.40
248		KENOALL R.S.	1- 5	23	0.946	<.01		16.50	0.50				-0.140		16.47,	-
253		KIRWIN	1- 5		-0.464	3.94		14.60	0.20		-4.00		0,023		14.48,	
264	RH10	LAPRELE CREEK	1- 5	23	0.733	<.01	19.34	16.30	6.30	7.60	-6.10	29.50	-1.362	0.180	19.03,	19.65*
269	RH10	LEWIS LAKE DIVIDE	1- 5	22	0.908	<.01	25.80	25.50	0.70	9.27	-3.80	26.40	-0.230	0.025	25.41,	26.19*
277	PR 10	LITTLE WARM	1- 5	22	0.013	95.30	17.83	17.50	0.60	5.80	-8.20	28,60	-0.004	0.000	17.53,	18.13*
			1- 5	20	-0.036	87.98	18.48	18.40	0.20				0.003	0.000	18.22,	18.74
			1- 5	19	0.593	0.74	18.47	18.20	0.40	9,27	-5.10	27.10	-0.073		18.18,	
310	PR 10	MIOOLE POWOER	1- 5	22	0.325	13.99	18.40	18.30	0.20	10.27	-0.60	29.10	-0.014	0.002	18.15,	18.65
342		NEW FORK LAKE	1- 5	22	0.853	<.01	16.81	16.10	1.80	8.59	-3.10	25.40	-0.568	0.066	16.56,	17.06
	PR10	NORTH FRENCH CREEK			0.605	0.28		22,20	0.30				-0.042		21.96,	
		NOWOOD			-0.043	86.06		10.20	0.50		-3.20		0.011		10.33,	
					-0.599	0.32		30.50	0.60			21.90			30,28,	
					-0.109	66.82		11.70	0.50				0.014		11.92,	
362	PR 10	PARKER PEAK	1- 5	21	0.810	<.01	16.88	16.60	0.50	4.61	- 7.90	25.30	-0.083	0.017	16.60,	17.16*
			1- 5		0.488	2.46	-	27.50	0.60	-			-0.089		27.39,	
			1- 5		0.429	5.21		15.80	0.50				-0.024		15.92,	
			1- 5		0.813	<.01		22.90	1.50				-0.603		23.14,	
			1- 5			100.00		15.00	0.00		-	-	0.000		14.77,	
. 50			. ,	0	000				00					-,	,	

^{*} INDICATES THAT ONE OR MORE MEASURED PRECIPITATION DATA VALUES FELL OUTSIDE THE SPECIFICATION ERROR BAND.

TABLE 44. PRECIPITATION-TEMPERATURE 1987 FLUTTER STUDY STATISTICS FOR SNOTEL SITES IN WYOMING (CONTINUED).

					P/T		DANO	5 O5 55	4011100					RATURE		
						0400		E OF RE						ECTION		
C . T C	eeneo	0 010751	JUNE		CORRE-	RANDOM			RECIP		RATURE			ATION		ICATION
	SENSO		1987		LATION	PROB		(INCHES			EGREES			a + bT)	ERROR	
NO	TYPE	STATION NAME	OATE	NOB 2	(R)	(PCT)	A VE	MIN	OELTA	AVE	MIN	0ELTA	a	ь	LOW	HIGH
409	RH10	SANO LAKE	1- 5	21	0.619	0.27	23,97	23.70	0.60	4.91	- 6.00	22.40	-0.068	0.013	23.59,	24.35
410		SANOSTONE RS	1- 5	25	-0.810	<.01	16.00	15.80	0.40	11.19	-1.30	23,60	0.153	-0.014	15.77,	16,23
427	PR 10	SHELL CREEK	1- 5	20	-0.141	55,20	16.80	16.70	0.20	0.38	-11.20	27.70	0.005	-0.001	16.50,	17.10
440	RH10	SNIOER BASIN	1- 5	21	0.975	<.01	28.15	13.70	72.30	25,44	-4.10	99.90	-19.836	0.780	27.28,	29.02*
445	PR 10	SOUTH 8RUSH CREEK	1- 5	20	0.209	37.71	14.62	14.50	0.20	9.73	- 3.30	25.70	-0.017	0.002	14.40,	14.84
447		SOUTH PASS	1- 5	22	0.029	89.81	17.59	-3.70	24.60	9,62	-4.50	26,90	-0.298	0.031	17.32,	17.86*
451	PR 10	SPRING CREEK DIVIDE	1-5	23	-0.187	39.25	21.11	21.00	0.20	8,90	-2.80	21.80	0.018	-0.002	20.80,	21.42
456	PR 10	ST. LAWRENCE	1- 5	20	-0.317	17.35	15.94	-2.80	20.90	9.17	-5.50	29.90	2.066	-0.226	15,69,	16.19
457	PR 10	ST. LAWRENCE ALT	1- 5	21	-0.385	8.51	14.29	-2.30	18.40	8.50	-4.50	27,40	2.139	-0.252	14.07,	14.51
469	PR10	SUCKER CREEK	1- 5	23	0.162	46.06	18.79	18.70	0.30	6.90	-5.90	28.40	-0.016	0.002	18.49,	19.09
477	PR 10	SYLVAN LAKE	1- 5	23	-0.405	5.51	20.74	20,60	0.40	4.94	-10.00	31.70	0.030	-0.005	20.38,	21.10
486	RH10	TOGWOTEE PASS	1- 5	22	0.323	14.24	26,28	26,20	0.20	3,51	-8.00	25.80	-0.010	0.002	25,85,	26.71
490	PR 10	TOWNSENO CREEK	1- 5	21	0.348	12.22	18.80	-1.70	47.40	10.13	-5.70	32.40	-3.132	0.309	18.51,	19.09*
494		TRIPLE PEAK	1- 5	23	0.887	<.01	23,59	22,60	1.80	8,52	-3.40	23,90	-0.686	0.081	23.24,	23.94*
496	PR10	TROUT CK	1- 5	21	0,576	0.63	13,88	13,30	0.80	8,55	-4. 90	28,40	-0.121	0.014	13,67,	14.09*
501	RH15	TWO OCEAN PLATEAU	1- 5	20	0.775	<.01	24.77	24.60	0.40	6,20	-9.50	30.30	-0.067	0.011	24.35,	25.19
516	PR 10	WARREN PEAK	1- 5	24	-0.080	70.91	18.19	18.10	0.10	9.75	-0.10	26.50	0.005	0.000	17.94,	18.44
517	RH10	WE88ER SPRINGS	1- 5	20	0.947	<.01	22.88	22.30	1.40	9.36	-1.00	23.80	-0.494	0.052	22,56,	23,20*
532	RH15	WILLOW CREEK	1- 5	25	0.953	<.01	28.82	28.40	1.00	10.08	-1.70	24.70	-0.344	0.034	28.41,	29.23*
535	RH05	WINDY PEAK	1- 5	20	0.859	<.01	24.07	23.80	0.50	11.75	-2.00	28,30	-0.186	0.015	23,73,	24.41
538	PR10	WOLVERINE	1- 5	23	0.833	<.01	15.73	15.30	0.80	9,27	-4.50	30.10	-0.182	0.020	15.49,	15.97*
552		Z WYOMING	1- 5	21	0.000	100.00	50.00	50.00	0.00	23,12	21.30	4.40	0.000	0.000	49.70,	50,30

^{*} INDICATES THAT ONE OR MORE MEASURED PRECIPITATION DATA VALUES FELL OUTSIDE THE SPECIFICATION ERROR 8AND.

TABLE 45. PRECIPITATION-TEMPERATURE 1987 FLUTTER STUDY STATISTICS FOR SNOTEL SITES IN UNKNOWN STATES.

					Р/Т			E OF RE					TEMPER CORRE	RATURE ECTION		
			JUNE		CORRE-				RECIP	TEMPE	RATURE	RANGE	EQU <i>A</i>	ATION	SPECIF	ICATION
SITE	SENS0		1987		LATION			(INCHES		(D	EGREES	C)	(c = a	a + bT)	ERR0R	BANO
NO	TYPE	STATION NAME	DATE	NOBS	(R)	(PCT)	A VE	MIN	DELTA	AVE	MIN	DELTA	a	b	LOW	HIGH
65		BRIGHTON	1- 5	21	0.770	<.01	27.53	27.30	0.40	9.95	-0.30		-0.141		27.15,	27.91
69		BRUNDAGE RESERVOIR	1- 5	21	0.879	<.01	28,22	28.00	0.50	11.20	-1.90	26,60	-0.215	0.019	27.82,	28,62
103		CLOVER VALLEY	1- 5	15	-0.230	40.90	21.59	21.20	0.50	27.47	10.80	28.70	0.071	-0.003	21.36,	21.82*
124		CROSH0	1- 5	22	0.541	0.92	17.35	17.10	0.60	9.73	-1.50	23.30	-0.151	0.015	17.10,	17.60*
154	DUM3	EAGLEHEAO	1- 5	21	0.000	100.00	0.00	0.00	0.00	-0.77	-13.20	23.80	0.000	0.000	0.00,	0.00
159	RH10	EILERTSON MEADOWS	1- 5	21	0.921	<.01	20.12	19.40	1.30	10.58	-2.60	25.50	-0.519	0.049	19.83,	20.41*
202	PR 10	HAGAN'S MEADOW	1- 5	21	-0.142	53.87	14.06	13.90	0.20	12.62	-2.50	23.40	0.019	-0.001	13.86,	14.26
287	PR15	LOOMIS PARK	1-5	22	0.636	0.14	19.45	19.30	0.30	7.94	-3.30	25.90	-0.053	0.007	19.16,	19.74
308		MESA LAKES	1- 5	21	0.390	8.03	26,98	26.80	0.40	8.91	-3.10	21.10	-0.067	0.007	26.58,	27.38
337	PR10	N FK ELK CREEK	1- 5	20	-0.661	0.15	13.95	13.80	0.30	14.94	3.30	28.70	0.113	-0.007	13.78,	14.12
387		RABBIT EARS	1- 5	22	-0.843	<.01	27.61	27.50	0.20	8,35	-2.50	22.50	0.057	-0.007	27.21,	28.01
395		RIPPLE CREEK	1- 5	23	0.749	<.01	29.99	29.90	0.20	9.13	-2.80	25.70	-0.054	0.006	29.55,	30.43
422	RH15	SEVENMILE MARSH	1- 5	22	-0.921	<.01	37.61	37.10	1.20	13.95	-3.40	27.60	0.652	-0.046	37.05,	38,17
452		SPUD MOUNTAIN	1- 5	20	0.757	0.01	39.89	39.30	1.30	8.51	-0.20	18.40	-0.317	0.037	39.34,	40.44
468		STUMP LAKES	1- 5	21	0.461	3,52	36.85	36.60	0.60	-51.14	-51.30	2.10	9.240	0.181	35.67,	38.03
503		UPPER RIO GRANOE	1- 5	25	0.862	<.01	20.40	19.90	1.20	9.19	-2.30	23,60	-0.378	0.041	20.11,	20.69
523		WHISKEY PARK	1- 5	22	0.914	<.01	22.37	22.10	0,60	8.58	-2.00	21.90	-0,229	0.026	22.05,	22.69
550		Z STROMQUIST BENCH	1- 5	21	0.000	100.00	0.00	0.00	0.00	17.96	7.10	23,20	0.000	0.000	0.00,	0.00
551		Z STROMQUIST TEST	1- 5	24	0.000	100.00	0.00	0.00	0.00	17.95	6.50	24,60	0.000	0.000	0.00,	0.00
558		ZZZ LAPOINT	1-5	24	0.000	100.00	0.00	0.00	0.00	65.07	45.30	37.00	0.000	0.000	0.00,	0.00

^{*} INDICATES THAT ONE OR MORE MEASURED PRECIPITATION DATA VALUES FELL OUTSIDE THE SPECIFICATION ERROR BAND.

Table 46. Sites selected as candidates for transducer replacement during 1987.

SITE NO	SNOTEL STATION NAME	SITE NO	SNOTEL STATION NAME
	ARIZONA		OREGON (CONTINUED)
114	CORONADO TRAIL	174	FISH LK.
470	SUGAR LOAF	216	HIGH RIDGE
		229	HYATT PRAIRIE
	COLORADO	251	KING MOUNTAIN
79	BUTTE	276	LITTLE MEADOWS
106	COLUMBINE	388	RAILROAD OVERPASS
107	COLUMBINE PASS	404	SADDLE MOUNTAIN
186	GALLEGOS PEAK	407	SALT CREEK FALLS
273	LILY POND	414	SCHNEIDER MEADOWS
295	LYNX PASS	481	TAYLOR GREEN
304	MC CLURE PASS		
338	NAST LAKE		UTAH
334	WILLOW PARK	29	BEAVER DAMS
		81	CAMP JACKSON
	IDAHO	170	FARNSWORTH LAKE
12	BANNER SUMMIT	265	LASAL MOUNTAIN
192	GRAHAM GUARD STATION	271	LIGHTNING LAKE
319	MOORES CREEK SUMMIT	324	MOSBY MTN.
325	MOSQUITO RIDGE		
424	SHANGHI SUMMIT		WASHINGTON
463	STICKNEY MILL	52	BLEWETT PASS
474	SUNSET	116	CORRAL PASS
509	VIENNA MINE	173	FISH LAKE
		314	MIRROR LAKE
	MONTANA	323	MORSE LAKE
153	DUPUYER CREEK	370	PIGTAIL PEAK
		374	PLAINS OF ABRAHAM
	NEVADA	385	QUARTZ PEAK
157	EBBETTS PASS	459	STAMPEDE PASS
333	MT. ROSE	462	STEVENS PASS
376	POLE CREEK R. S.	467	STRAWBERRY LANDING
444	SONORA PASS		
455	SQUAW VALLEY G. C.		WYOMING
478	TAHOE CITY CROSS	14	BASE CAMP
514	WARD MOUNTAIN	26	BEARTOOTH LAKE
520	WET MEADOWS	43	BIG SANDY OPENING
		194	GRASSY LAKE
_	OREGON	248	KENDALL R. S.
4	ARBUCKLE MTN	269	LEWIS LAKE DIVIDE
44	BIGELOW CAMP	342	NEW FORK LAKE
45	BILLIE CREEK DIVIDE	394	RENO HILL
60	BOURNE	494	TRIPLE PEAK
131	DALY LAKE	517	WEBBER SPRINGS
138	DIAMOND LAKE	532	WILLOW CREEK
172	FISH CREEK	538	WOLVERINE

TABLE 47. PRECIPITATION-TEMPERATURE FLUTTER STUDY STATISTICS FOR SELECTED SNOTEL SITES IN OCTOBER 1987.

					P/T			E OF RE						CTION		
			OCTOBER			RANDOM			RECIP		RATURE		EQUA	TION	SPEC IF	ICATION
SITE	SENSO	R SNOTEL	1987		LATION	PROB		(INCHES)	(C	EGREES	C)	(c = a	+ bT)	ERROR	BAN0
	TYPE		DATE			(PCT)		MIN		AVE		0ELTA	a	ь	LOw	HIGH
14	Du 10	CORONAOO TRAIL	2-12	36	0.903	<.01		1ZONA 0.00	0.50	10.30	-2 30	26 30	-0.155	0.015	0.10	0.10
																0.19
59	RHIU	SUGAR LOAF	2-12	41	-0.484	0.13	1,50	-0.90	8,60	-2,21	-45.60	15.50	-0.119	-0.054	1,45,	1,00
							co	LORADO								
11	RH10	BUTTE	2-12	43	0.210	17.68		-0.10	0.20	7.48	-2.10	22.10	-0.023	0.003	0.03.	0.03
13	RH10	COLUMBINE	2-12		0.984	<.01		-0.20	1.30		-		-0.360	0.027	0.37,	
			2-12		-	50.11	-2.20		28.10				-1.099	-	-2.17.	
		LILY POND	2-12		-	<.01	-	-0.40	1.20	8.28	-1.40	20.00	-0.225	0.028	0.03.	
36	PR 10	LYNX PASS	2-12	42	-0.516	0.04	-0.16		0.80				0.085		-0.16,	
37	RH10	MC CLURE PASS	2-12	35	0.964	<.01	0.70	-0.10	2.00	10.97	2.80	18.70	-1.210	0.110	0.69,	0.71
43		NAST LAKE	2-12	45	0.970	<.01	0.70	-0.20	1.80	7.22	- 6.40	29.40	-0.390	0.054	0.69,	0.71
_				7.0			10		0.70	0.70		70.70	0.177	0.016	0.16	0.16
		BANNER SUMMIT	2-12		0.772	<.01		-0.30	0.70	-			-0.137	0.016		0.16
		GRAHAM GUARO STA.			0.906	<.01		-0.30	6,10				-1.967	0.210		2,83
		MOORES CREEK SUMMIT			0.886	<.01		0.00	0.40				-0.084	0.017		0.12
		- •	2-12		-	<.01		-0.40	0.80	•	-	21.00	-	-0.027		0.00
55	RHID	SHANGHI SUMMIT	2-12	40	-0.676	<.01	-0.02	-0.10	0.10	11,27	0.20	24.20	0.051	-0.005	-0.02,	-0.02
57	PH10	STICKNEY MILL	2-12	34	0,612	0.01	-0.01	-0.30	0.70	8 88	-8 40	31.00	-0,123	0.014	-0.01,	-0.01
		SUNSET	2-12		-	48.31	1.09		4.00				-0.368	0.037	1.07.	
64		VIENNA	2-12		0.321	6.02	• • • •	-0.10	0.20	-		•	-0.019	0.002		0.00
•		712.1101	- 12		0.52	0,02	••••	••••	0,20	••••			••••	••••	0,00,	••••
								NTANA								
18		OUPUYER CREEK	2-12	43	0.650	<.01	0.07	0.00	0.40	7,56	-8.70	29.10	-0.080	0.011	0.07,	0.07
							0R	FGON								
1	RH10	ARBUCKLE MTN	2-12	38	0.304	6,36		-0.10	0.20	9.34	-23,10	44,20	-0.024	0.002	0.02.	0.02
		BIGELOW CAMP	2-12		0.151	37.89		0.00	0.20				-0.030	0,002		0.04
		BILLIE CREEK OIVIOE			-	0.06		-1.00	14.00			37.50		-0.131		0.13
		BOURNE	2-12		-0.771	<.01		-0.50	0.70			17.90		-0.033	-0.05,	-0.05
16	RH20	DALY LAKE	2-12	39	-0.871	<.01	0.00	-0.80	1.40	17.35	9.30	20.10	1.203	-0.069	0.00,	0.00
			2-12			<.01	0.34	0.00	0.90	13,33			-0.517	0.039	-	0.34
		FISH CREEK	2-12		0.721	<.01		0.00	0.40	10.75			-0.248	0.023		0.15
		FISH LK.	2-12		0.881	<.01	0.21	0.00	0.60	14.31			-0.300	0.021		0.21
		HIGH RIOGE	2-12		0.821	<.01		-0.40	1.10	18,41	-		-0.945	0.052	0.08,	
28	RH10	HYATT PRAIRIE	2-12	34	0.779	<.01	0.48	-0.20	2,50	14,18	5.20	21,40	-1.337	0.094	0.47,	0.49
30	RH15	KING MOUNTAIN	2-12	33	0.919	<.01	0 33	-0.70	3,60	17.76	9 90	18 30	-3,189	0,180	0 33	0.33
		LITTLE MEADOWS			-0.763	<.01	-0.13	-	0.60		-	19.50		-0.029		
		RAILROAD OVERPASS			•					•	-	-	4,498			
		SAOOLE MOUNTAIN			-	45.67	-		-	14.70	-	-	5.762	-	2.07,	
		SALT CREEK FALLS			-0.249	11,67			86.80			44.80		-0.369		3.42
_					•	•	•	•	•	•	•	•	•	•		-
51	RH10	SCHNE LOER MEADOWS	2-12	41	-0.139	38.44	0.87	0.00	32.00	10.93	-5.00	30.90	0.900	-0.082	0.86,	0.88
61	RH15	TAYLOR GREEN	2-12	39	-0.113	49.16			27.00	13.95	1.20	24.20	1,101	-0.079	0.34,	0.34
							UT									
		BEAVER DAMS	2-12		0.856	<.01		-0.30	1.30	-	-		-0.721	0.059	-	0.32
12		CAMP JACKSON	2-12		0.917	<.01		0.10	0.60	13.10			-0.608	0.046		0.37
		FARNSWORTH LAKE	2-12			<.01		-0.10	1.20	10.67			-0.802	0.075		0.44
		LASAL MOUNTAIN	2-12		0.786	<.01		-0.10	0.30	10.76			-0.142	0.013		0.09
		LIGHTNING LAKE	2-12		0.598	<.01		-0.70	3.70				-0.681	0.106		0.72
4 1	RHIO	MOSBY MTN.	2-12	43	-0.761	<.01	-0.11	-0.40	0.40	8.21	-1.30	18.70	0.142	-0.018	-0.11,	-0.11

^{*} INDICATES THAT ONE OR MORE MEASURED PRECIPITATION DATA VALUES FELL DUTSIDE THE SPECIFICATION ERROR BAND.

TABLE 47. PRECIPITATION-TEMPERATURE FLUTTER STUDY STATISTICS FOR SELECTED SNOTEL SITES IN OCTOBER 1987 (CONTINUED).

													TEMPE			
					P/T								CORR			
			OCTOBER		CORRE-	RANDOM							EQU/		SPECIF	ICATION
			1987		LATION	PROB		(INCHES	()	((EGREES	C)	(c =	a + bT)	ERROR.	BANO
		STATION NAME											a		LOW	HIGH
								SHINGTO								
9	RH15	BLEWETT PASS	2-12	38	-0.332	4.14	1.84	-0.60	70.00	11,62	0.00	22.90	7.966	-0.685	1.81,	1.87*
15	PR 15	CORRAL PASS	2-12	39	-0.275	9.06	0.07	0.00	0.30	11.24	3.30	16.90	0.062	-0.006	0.07,	0.07*
22	RH15	FISH LAKE	2-12	30	0.917	<.01	0.14	-0.10	0.70	11.01	-0.90	24.70	-0.287	0.026	0.14,	0.14*
38	RH20	MIRROR LAKE	6-12	23	0.157	47.52	10.42	-21.10	92.80	7.42	-2.50	23.80	-4.449	0.599	10.27,	10.57*
40	RH20	MORSE LAKE	5-12	24	0.359	8.46	28.08	0.00	61.90	11.99	-1.20	24.60	-18.471	1.541	27.69,	28.47*
45	RH15	PIGTAIL PEAK	2-12	40	0.194	22,92	1.55	-0.30	56.10	9.69	0.90	18.90	-3.384	0.349	1,53,	1.57*
46	RH25	PLAINS OF ABRAHAM	2-12	43	0.142	36.46	2,63	0.00	110.00	14.07	8.00	13.30	-8.733	0.620	2,60,	2,66*
55	RH25	STAMPEGE PASS	2-12	36	-0.040	81.71	-0.45	-14.70	14.90	11,65	4.50	17.00	0.255	-0.022	-0.44,	-0.46*
56	RH20	STEVENS PASS	2-12	35	-0.036	83.93	1.88	-0.90	75.20	10.25	1.50	20.10	0.836	-0.082	1.86,	1.90*
58		STRAWBERRY L	2-12	43	0,165	29.04	1.45	-1.20	80.90	-11.30	-20.00	17.60	4.547	0.403	1,42,	1.48*
							WY	OMING								
3	PR 10	BASE CAMP	2-12	38	0.856	<.01	0.36	-0.10	1,20	7,15	-7.10	30.30	-0.305	0.043	0.35,	0.37*
4	PR 10	BEARTOOTH LAKE	2-12	40	0.735	<.01	0.04	0.00	0.20	-1.69	-18,60	29.70	0.008	0.006	0.04,	0.04*
6	RH10	BIG SANDY OPENING	2-12	44	0.951	<.01	0.60	0.00	1,60	5.39	-8.40	26.30	-0.337	0.062	0.59,	0.61*
26	RH15	GRASSY LAKE	2-12	39	-0.891	<.01	-0.22	-0.80	0.90	5.77	-11.40	32,20	0.160	-0.027	-0.22,	-0.22*
29		KENOALL R.S.	2-12	39	0.926	<.01	0,12	-0.10	0.50	5.56	-9.10	31.30	-0.095	0.016	0.12,	0.12*
32	RH10	LEWIS LAKE OIVIOE	2-12	42	0.763	<.01	0.11	-0.10	0.50	9,48	-6.50	29,60	-0,142	0.015	0.11.	0.11*
44		NEW FORK LAKE	2-12	41	0.702	<.01	0.04	0.00	0.20	6,22	-7.70	28,50	-0.038	0.006	0.04.	0.04*
48	RH10	RENO HILL	2-12	38	0.437	0.61	-0.49	-5.00	10.30	-1.92	-23,60	44.00	0.188	0.099	-0.48.	-0.50*
62			2-12	39	0.829	<.01	0.23	0.00	0.60	6.35	-8.80	25,90	-0.154	0.025	0.23,	0.23*
	RH10	WEBBER SPRINGS			0.777	<.01	-	-	0.70	7.84	-6.30	27.10	-0.189	0.024	0.22,	0.22*
67	RH15	WILLOW CREEK	2-12	41	0.030	85.08	2.80	-6.00	46.10	9.90	-0.50	24.20	-0.516	0.052	2.76.	2.84*
		WOLVERINE			0.554	0.03	0.18	0.00	0.70	6.09	-12.30	34.60	-0.082	0.013	0.18,	0.18*

^{*} INDICATES THAT ONE OR MORE MEASURED PRECIPITATION DATA VALUES FELL OUTSIDE THE SPECIFICATION ERROR BAND.

Section II Analysis of Reasonable Maximum and Reasonable Minimum Methods

The objective of this phase of the study was to compare the different methods of calculating the reasonable maximum and minimum values reported by the different forecast centers. Seven forecast stations were selected for evaluation and the work has begun. The methods identified for evaluation were:

A. Fort Worth RFC method. This is essentially a standard multiple regression technique calculating the reasonable maximum and minimum as the 90 percent confidence band for a particular estimate; i.e.,

Reasonable Maximum = Yest + $t_{(90,df)}$ *SE*SQRT(1 + 1/n + X'CX)

Reasonable Minimum = Yest - $t_{(90,df)}$ *SE*SQRT(1 + 1/n + X'CX)

- B. Portland RFC method. Regression method based on a single equation derived from composite variables indexing fall precipitation, spring precipitation, and antecedent moisture. Values needed for the index variables that are not available at the time of forecast are estimated from the long time average values of the respective variates. The reasonable maximum and minimum are the 80 percent confidence band estimated about a particular point. If the Standard Error of the estimating equation is not available, it is estimated by using values from a past analysis of forecast errors at the site (FEARS Analysis).
- C. Salt Lake City RFC method. Regression method used for estimating the most probable forecast value but the reasonable maximum and minimum are based on an analysis of runoff indexed to antecedent snow and precipitation as it accumulates during the forecast season.
- D. Kansas City RFC method. Regression method using a single index parameter composed of weighted monthly hydrologic variables such as precipitation, snow water equivalent, and runoff. The reasonable maximum and minimum adjustments are determined for each month by partitioning the variables of which the index parameter is composed into its known and unknown or future elements, calculating the index parameter for the entire historical period as partitioned above, sorting the resulting indecies in descending order, and then selecting the 90 and 10 percent decile values as the adjustments for the reasonable maximum and minimum respectively.
- E. SCS FEARS method. Determine reasonable maximum and minimum based on an analysis of past forecast errors. Essentially uses the 10 and 90 percent decile of the average forecast error to determine the reasonable maximum and minimum. In particular, a normal distribution is fit to the forecast errors with the 50 percent value adjusted to zero, thus shifting the 10 and 90 percent exceedence values. These are then used to adjust the most probable forecast value to obtain the reasonable maximum and minimum.

Much of the data for the seven basins has been downloaded to our VAX and evaluation of the data for the American Fork River near American Fork, Utah was completed. The results obtained for the American Fork River are tabulated in

Tables 48-51. The criteria for comparison include the Nash-Sudcliff coefficient of efficiency, Ce, the coefficient of determination, RSQ, the Standard Error, SE, of the estimating equation, the adjustment factors for calculating the reasonable maximum and minimum estimates, the probability, $P_{\rm t}$, of the confidence interval represented by the reasonable maximum and minimum estimates, and the 1983 forecast values for the most probable, reasonable maximum and reasonable minimum. The data used for the development of the predicting equations and for all subsequent comparisons was for the water years 1961-1983.

Table 48. Comparison of different forecast center methods for calculating the reasonable maximum and reasonable minimum values for the American Fork River basin January forecast.

Statistic	Reference 1 var	Ft. Worth Method		SLC Method	KC Method	SCS FEARS Method
Se	15.802	15.586	23.819	19.527	12.423	NA
df	21	20	20	19	21	
Ce	• 040	•111	-5.18	 325	• 407	
RSQ	• 040	•111	•057	• 047	• 407	
Rmax Adj	+21.36	+21.10	+31.19	+15.46	+8.54	
Rmin Adj	-21.36	-21.10	-31.19	-16.61	-8.83	
Prmax	90%	90%	89.3%	77.6%	74.6%	
Prmin	10%	10%	10.7%	20.8%	24.7%	
1983 Est.	40.62	54.67	67.99	51.83	49.92	
1983 Rmax	61.98	75.77	99.18	67.29	58.47	
1983 Rmin	19.26	33.57	36.80	35.22	41.10	

Table 49. Comparison of different forecast center methods for calculating the reasonable maximum and reasonable minimum values for the American Fork River basin February forecast.

Statistic	Reference l var	Ft. Worth Method	Portland Method	SLC Method	KC Method	SCS FEARS Method
Se	11.916	12.038	12.902	12.804	12.42	13.290
df	21	20	20	19	21	21
Ce	• 455	•470	.391	• 430	• 407	.322
RSQ	. 455	• 470	•470	.432	• 407	• 444
Rmax Adj	+16.10	+16.29	+16.90	+12.61	+11.76	+15.31
Rmin Adj	-16.10	-16.29	-16.90	-13.42	-12.25	-15.31
Prmax	90%	90%	89.3%	82.6%	81.8%	86.4%
Prmin	10%	10%	10.7%	15.9%	17.3%	13.6%
1983 Est.	43.30	50.09	56.23	44.38	51.28	56.23
1983 Rmax	59.40	66.38	73.13	56.99	63.03	71.54
1983 Rmin	27.20	33.80	39.33	30.96	39.03	40.92

Table 50. Comparison of different forecast center methods for calculating the reasonable maximum and reasonable minimum values for the American Fork River basin March forecast.

Statistic	Reference l var	Ft. Worth Method	Portland Method	SLC Method	KC Method	SCS FEARS Method
Se	10.500	10.383	10.737	11.464	12.423	11.390
df	21	20	20	19	21	21
Ce	• 577	.606	.578	• 543	. 407	• 502
RSQ	•577	.606	.606	•570	.407	•666
Rmax Adj	+14.19	+14.05	+14.06	+10.16	+12.57	+11.24
Rmin Adj	-14.19	-14.05	-14.06	-10.69	-14.76	-11.20
Prmax	90%	90%	89.3%	80.2%	83.3%	83.3%
Prmin	10%	10%	10.7%	18.6%	12.9%	16.8%
1983 Est.	43.10	52.41	55.09	43.66	52.14	55.09
1983 Rmax	57.29	66.46	69.15	53.82	64.71	66.33
1983 Rmin	28.91	38.36	41.03	32.97	37.38	43.89

Table 51. Comparison of different forecast center methods for calculating the reasonable maximum and reasonable minimum values for the American Fork River basin April forecast.

Statistic	Reference l var	Ft. Worth Method	Portland Method	SLC Method	KC Method	SCS FEARS Method
Se	7.435	7.027	7.038	9.669	12.423	9.896
df	21	20	20	19	21	21
Ce	.788	.819	.819	.675	.407	.624
RSQ	.788	.819	.819	.774	.407	.762
Rmax Adj	+10.05	+9.51	+9.22	+7.64	+13.15	+9.67
Rmin Adj	-10.05	-9.51	-9.22	-7.87	-16.3	-9.67
Prmax	90%	90%	89.3%	77.6%	84.4%	82.5%
Prmin	10%	10%	10.7%	21.8%	10.6%	17.5%
1983 Est.	49.78	59.28	60.22	46.91	53.27	60.22
1983 Rmax	59.83	68.79	69.44	54.55	66.42	69.89
1983 Rmin	39.73	50.28	51.00	39.04	36.91	50.55

Section III Instrumentation Study

Continuation of the Upper Sheep study on the Reynolds Creek Experimental Watershed has provided the opportunity to monitor the operation of several types of climatological field sensors. Some of the sensors have been in continuous operation for over four years. Comments regarding sensor reliability and data quality are noted below.

A. Soil Moisture

The gypsum soil moisture blocks have continued to provide reliable gross indication of soil moisture for the fourth year without any problems.

B. Humidity

The Texas Electronics model TH-2013 humidity sensor continues to provide high quality data without any failures for the fourth year. Calibration is checked periodically and has continually been within specifications.

C. Wind Run

The Belfort #5-349C-5 anemometer has performed well since the modification to the switching system last year.

D. Pressure Transducer

Thirty-one of the 36 Druck model PDCR 10/D pressure transducers installed in piezometer tubes have performed well. Five transducers had to be replaced because of damage apparently caused by lightning. Approximately one-third of the transducers have been in use four years, one-third for three years, and one-third for two years.

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